DOE/CF-0192
Volume 1

Department of Energy
FY 2024 Congressional Justification

National Nuclear Security Administration

Federal Salaries and Expenses
Weapons Activities
Defense Nuclear Nonproliferation
Naval Reactors

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DEPARTMENT OF ENERGY
Appropriation Summary
(Dollars in Thousands)

	FY 2022 Enacted [1]	FY 2023 Enacted [1], [2], [3]	FY 2024 President's Budget	FY 2024 President's Budget vs. FY 2023 Enacted	
				$	%
Department of Energy Budget by Appropriation					
Energy Efficiency and Renewable Energy	3,200,000	3,460,000	3,826,116	+366,116	+10.6%
Electricity	277,000	350,000	297,475	-52,525	-15.0%
Cybersecurity, Energy Security and Emergency Response	185,804	200,000	245,475	+45,475	+22.7%
Strategic Petroleum Reserve	219,000	207,175	280,969	+73,794	+35.6%
Naval Petroleum and Oil Shale Reserves	13,650	13,004	13,010	+6	+0.0%
SPR Petroleum Account	7,350	-2,051,900	0	+2,051,900	+100.0%
Northeast Home Heating Oil Reserve	6,500	7,000	7,150	+150	+2.1%
Total, Petroleum Reserve Accounts	**246,500**	**-1,824,721**	**301,129**	**+2,125,850**	**+116.5%**
Total, Cybersecurity, Energy Security, and Emergency Response	**432,304**	**-1,624,721**	**546,604**	**+2,171,325**	**+133.6%**
Nuclear Energy (270) [1], [2], [3]	1,505,000	1,623,000	1,384,887	-238,113	-14.7%
Fossil Energy and Carbon Management	825,000	890,000	905,475	+15,475	+1.7%
Uranium Enrichment Decontamination and Decommissioning (UED&D)	860,000	879,052	857,482	-21,570	-2.5%
Energy Information Administration	129,087	135,000	156,550	+21,550	+16.0%
Non-Defense Environmental Cleanup	333,863	358,583	348,700	-9,883	-2.8%
Science [2]	7,475,000	8,100,000	8,800,400	+700,400	+8.6%
Office of Technology Transitions	19,470	22,098	56,550	+34,452	+155.9%
Office of Clean Energy Demonstrations	20,000	89,000	215,300	+126,300	+141.9%
Federal Energy Management Program	0	0	82,200	+82,200	N/A
Grid Deployment Office	0	0	106,600	+106,600	N/A
Office of Manufacturing & Energy Supply Chains	0	0	179,490	+179,490	N/A
Office of State and Community Programs	0	0	705,000	+705,000	N/A
Advanced Research Projects Agency - Energy	450,000	470,000	650,200	+180,200	+38.3%
Nuclear Waste Fund Oversight	27,500	10,205	12,040	+1,835	+18.0%
Departmental Administration	240,000	283,000	433,475	+150,475	+53.2%
Indian Energy Policy and Programs	58,000	75,000	110,050	+35,050	+46.7%
Inspector General	78,000	86,000	165,161	+79,161	+92.0%
Title 17 Innovative Technology Loan Guarantee Program	29,000	-136,018	-126,524	+9,494	+7.0%
Advanced Technology Vehicles Manufacturing Loan Program	5,000	9,800	13,000	+3,200	+32.7%
Tribal Energy Loan Guarantee Program	2,000	4,000	6,300	+2,300	+57.5%
Total, Credit Programs	**36,000**	**-122,218**	**-107,224**	**+14,994**	**+12.3%**
Energy Projects	0	221,969	0	-221,969	-100.0%
Total, Energy Programs	**15,966,224**	**15,305,968**	**19,732,531**	**+4,426,563**	**+28.9%**
Weapons Activities	15,920,000	17,116,119	18,832,947	+1,716,828	+10.0%
Defense Nuclear Nonproliferation	2,354,000	2,490,000	2,508,959	+18,959	+0.8%
Naval Reactors [1]	1,918,000	2,081,445	1,964,100	-117,345	-5.6%
Federal Salaries and Expenses	464,000	475,000	538,994	+63,994	+13.5%
National Nuclear Security Administration Rescissions	-288,133	0	0	0	N/A
Total, National Nuclear Security Administration	**20,367,867**	**22,162,564**	**23,845,000**	**+1,682,436**	**+7.6%**
Defense Environmental Cleanup	6,710,000	7,025,000	7,073,587	+48,587	+0.7%
Other Defense Activities	985,000	1,035,000	1,075,197	+40,197	+3.9%
Defense Uranium Enrichment D&D	573,333	586,035	427,000	-159,035	-27.1%
Total, Environmental and Other Defense Activities	**8,268,333**	**8,646,035**	**8,575,784**	**-70,251**	**-0.8%**
Nuclear Energy (050)	149,800	150,000	177,733	+27,733	+18.5%
Total, Atomic Energy Defense Activities	**28,786,000**	**30,958,599**	**32,598,517**	**+1,639,918**	**+5.3%**
Southeastern Power Administration	0	0	0	0	N/A
Southwestern Power Administration	10,400	10,608	11,440	+832	+7.8%
Western Area Power Administration	90,772	98,732	99,872	+1,140	+1.2%
Falcon and Amistad Operating and Maintenance Fund	228	228	228	0	N/A
Colorado River Basins Power Marketing Fund	0	0	0	0	N/A
Total, Power Marketing Administrations	**101,400**	**109,568**	**111,540**	**+1,972**	**+1.8%**
Federal Energy Regulatory Commission	0	0	0	0	N/A
Total, Energy and Water Development and Related Agencies	**44,853,624**	**46,374,135**	**52,442,588**	**+6,068,453**	**+13.1%**
Excess Fees and Recoveries, FERC	-9,000	-9,000	-9,000	0	N/A
Title XVII Loan Guar. Prog Section 1703 Negative Credit Subsidy Receipt	-10,000	-14,000	-7,000	+7,000	+50.0%
UED&D Fund Offset	-573,333	-586,035	-427,000	+159,035	+27.1%
Discretionary Funding by Appropriation	**44,261,291**	**45,765,100**	**51,999,588**	**+6,234,488**	**+13.6%**
DOE Budget Function	**44,261,291**	**45,765,100**	**51,999,588**	**+6,234,488**	**+13.6%**
NNSA Defense (050) Total	20,367,867	22,162,564	23,845,000	+1,682,436	+7.6%
Non-NNSA Defense (050) Total	8,418,133	8,796,035	8,753,517	-42,518	-0.5%
Defense (050)	*28,786,000*	*30,958,599*	*32,598,517*	*+1,639,918*	*+5.3%*
Science (250)	7,475,000	8,100,000	8,800,400	+700,400	+8.6%
Energy (270)	8,000,291	6,706,501	10,600,671	+3,894,170	+58.1%
Non-Defense (Non-050)	*15,475,291*	*14,806,501*	*19,401,071*	*+4,594,570*	*+31.0%*

(1) Funding does not reflect the mandated transfer of $92.75 million in FY 2022 and $99.75 million in FY 2023 from Naval Reactors to the Office of Nuclear Energy for operation of the Advanced Test Reactor.

(2) Funding does not reflect the mandated transfer of $20 million from the Office of Nuclear Energy to the Office of Science for Nuclear Facilities Oak Ridge National Laboratory Operations and Maintenance.

(3) FY 2023 Enacted levels for base funding includes $300 million for the Office of Nuclear Energy that was enacted in Division M, Additional Ukraine Supplemental Appropriations, of the Consolidated Appropriations Act, 2023 (P.L. 117-328). This funding is a part of the total $12.5 billion governmentwide originally intended to be base appropriations that was designated as emergency requirements for purposes of the 2023 Omnibus agreement.

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National Nuclear Security Administration
Overview

($K)

	FY 2022 Enacted [a]	FY 2023 Enacted[b]	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
National Nuclear Security Administration					
Federal Salaries and Expenses	464,000	475,000	538,994	+63,994	+13.5%
Weapons Activities	15,920,000	17,116,119	18,832,947	+1,716,828	+10.0%
Defense Nuclear Nonproliferation	2,354,000	2,490,000	2,508,959	+18,959	+0.8%
Naval Reactors	1,918,000	2,081,445	1,964,100	-117,345	-5.6%
Total, National Nuclear Security Administration	**20,656,000**	**22,162,564**	**23,845,000**	**+1,682,436**	**+7.6%**

The National Nuclear Security Administration (NNSA) FY 2024 Request is $23,845,000,000, an increase of $1,682,436,000 (7.6 percent) above the FY 2023 Enacted Level to support the security and safety of the Nation. NNSA's FY 2024 Budget Request pursues five major national security endeavors: (1) maintain a safe, secure, reliable, and effective nuclear weapons stockpile; (2) reduce global nuclear threats and keep nuclear and radiological materials out of the hands of terrorists; (3) strengthen key science, technology and engineering capabilities in support of certification, assessment, and current and future life extension programs; (4) provide safe and militarily-effective integrated nuclear propulsion systems for the U.S. Navy; and (5) modernize the Nuclear Security infrastructure. Key to all these efforts is the necessary Federal oversight for growing mission requirements. NNSA has pursued a disciplined process to meet nuclear security and nonproliferation policy goals and requirements, support the Navy, and support a highly skilled federal workforce. The FY 2024 Budget request for NNSA is fully informed by and supports the 2022 Nuclear Posture Review (NPR) and National Security Strategy. It includes full support for modernizing all three legs of the nuclear triad and utilizing all aspects of the nation's deterrence capability. This includes enduring support for arms control, risk reduction measures, and nuclear safeguards as well as counterterrorism and counterproliferation measures. The FY 2024 Budget Request will provide the resources necessary to maintain and certify the effectiveness of the nation's nuclear deterrent, supporting NNSA's cutting-edge science and technology program.

National Nuclear Security Administration
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
National Nuclear Security Administration				
Federal Salaries and Expenses	560,956	583,940	603,562	616,938
Weapons Activities	19,390,942	19,818,932	20,285,683	20,747,386
Defense Nuclear Nonproliferation	2,660,502	2,785,887	2,887,670	2,926,376
Naval Reactors	2,187,600	2,132,241	2,076,085	2,105,300
Total, National Nuclear Security Administration	**24,800,000**	**25,321,000**	**25,853,000**	**26,396,000**

NNSA Future-Years Nuclear Security Program

NNSA's Future Years Nuclear Security Program (FYNSP) topline for FY 2025 – FY 2028 is $102.4 billion. This Request supports the modernization efforts and the scientific tools necessary to execute the 2022 Nuclear Posture Review and National Security Strategy. The Request continues to modernize America's nuclear stockpile and infrastructure, and the underlying science that supports strategic decisions and certification of the stockpile, as detailed in the annual *Stockpile Stewardship and Management Plan (SSMP)*. The Request supports the U.S. Navy's nuclear fleet through safe and effective

[a] FY 2022 Enacted excludes the mandated transfer of $92.75 million from Naval Reactors to the Office of Nuclear Energy for operation of the Advanced Test Reactor as well as a rescission of $282.1 million from project 99-D-143, Mixed Oxide Fuel Fabrication Facility, SRS within Defense Nuclear Nonproliferation and $6 million from completed construction projects within Naval Reactors.

[b] FY 2023 Enacted excludes the mandated transfer of $99.75 million from Naval Reactors to the Office of Nuclear Energy for operation of the Advanced Test Reactor as well as Ukraine Supplemental Appropriations totaling $161.3 million within Defense Nuclear Nonproliferation.

integrated nuclear propulsion systems. The Request also supports the nonproliferation goals outlined in NNSA's *Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats (NPCR)*.

Public Law Authorizations

- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-397, National Defense Authorization Act for Fiscal Year 2023
- P.L. 117-328, Consolidated Appropriations Act, 2023
- P.L. 117-81, National Defense Authorization Act for Fiscal Year 2022
- P.L. 117-103, Consolidated Appropriations Act, 2022

Appropriation Summary by Program
Funding

($K)

	FY 2022 Enacted [a]	FY 2023 Enacted [b]	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
NNSA Summary by Appropriation / GPRA Unit					
Federal Salaries and Expenses Appropriation					
Program Direction	464,000	491,800	538,994	+47,194	+9.6%
Use of Prior Year Balances	0	-16,800	0	+16,800	-100.0%
Total, Federal Salaries and Expenses	**464,000**	**475,000**	**538,994**	**+63,994**	**+13.5%**
Weapons Activities Appropriation					
Stockpile Management	4,637,676	4,954,107	5,204,899	+250,792	+5.1%
Production Modernization	4,156,897	5,116,705	5,555,928	+439,223	+8.6%
Stockpile Research, Technology, and Engineering	2,866,121	2,949,996	3,196,644	+246,648	+8.4%
Academic Programs and Community Support [c]	111,912	111,912	152,271	+40,359	+36.1%
Infrastructure and Operations	2,487,354	2,602,580	2,767,126	+164,546	+6.3%
Secure Transportation Asset	330,764	344,437	357,064	+12,627	+3.7%
Defense Nuclear Security	844,090	872,100	1,016,756	+144,656	+16.6%
Information Technology and Cybersecurity	406,530	445,654	578,379	+132,725	+29.8%
Legacy Contractor Pensions and Settlement Payments	78,656	114,632	65,452	-49,180	-42.9%
Subtotal, Weapons Activities	15,920,000	17,512,123	18,894,519	+1,382,396	+7.9%
Use of Prior Year Balances	0	-396,004	-61,572	+334,432	-84.5%
Total, Weapons Activities	**15,920,000**	**17,116,119**	**18,832,947**	**+1,716,828**	**+10.0%**
Defense Nuclear Nonproliferation Appropriation					
Defense Nuclear Nonproliferation Programs					
Material Management and Minimization	342,946	464,285	446,025	-18,260	-3.9%
Global Material Security	531,441	532,763	524,048	-8,715	-1.6%
Nonproliferation and Arms Control	184,795	230,656	212,358	-18,298	-7.9%
Defense Nuclear Nonproliferation R&D	729,236	767,902	728,187	-39,715	-5.2%
NNSA Bioassurance Program	0	20,000	25,000	+5,000	+25.0%
Nonproliferation Construction	156,000	71,764	77,211	+5,447	+7.6%
Subtotal, Defense Nuclear Nonproliferation Programs	1,944,418	2,087,370	2,012,829	-74,541	-3.6%
Nuclear Counterterrorism and Incident Response Program	370,782	469,970	493,543	+23,573	+5.0%
Legacy Contractor Pensions and Settlement Payments	38,800	55,708	22,587	-33,121	-59.5%
Subtotal, Defense Nuclear Nonproliferation Appropriation	**2,354,000**	**2,613,048**	**2,528,959**	**-84,089**	**-3.2%**
Use of Prior Year Balances	0	-123,048	-20,000	+103,048	-83.7%
Total, Defense Nuclear Nonproliferation Appropriation	**2,354,000**	**2,490,000**	**2,508,959**	**+18,959**	**+0.8%**
Naval Reactors Appropriation					
Naval Reactors Programs	1,918,000	2,081,445	1,964,100	-117,345	-5.6%
Total, Naval Reactors Appropriation	**1,918,000**	**2,081,445**	**1,964,100**	**-117,345**	**-5.6%**
Total, National Nuclear Security Administration	**20,656,000**	**22,162,564**	**23,845,000**	**+1,682,436**	**+7.6%**

[a] FY 2022 Enacted excludes the mandated transfer of $92.75 million from Naval Reactors to the Office of Nuclear Energy for operation of the Advanced Test Reactor as well as a rescission of $282 million from project 99-D-143, Mixed Oxide Fuel Fabrication Facility, SRS within Defense Nuclear Nonproliferation and $6 million from completed construction projects within Naval Reactors. The FY 2022 amounts are presented comparable to the proposed FY 2024 structure.
[b] FY 2023 Enacted excludes the mandated transfer of $99.75 million from Naval Reactors to the Office of Nuclear Energy for operation of the Advanced Test Reactor as well as Ukraine Supplemental Appropriations totaling $161.3 million within Defense Nuclear Nonproliferation. The FY 2023 amounts are presented comparable to the proposed FY 2024 structure
[c] Starting in FY 2024, NNSA is proposing to elevate Academic Programs from a congressional control level within Stockpile Research Technology and Engineering (SRT&E) to a stand-alone Government Results and Performance Act Unit titled, Academic Programs and Community Support. This change will enable improved program integration, agility, development, and alignment to critical workforce needs.

Appropriation Summary by Program
Outyear Funding

	FY 2025 Request ($K)	FY 2026 Request ($K)	FY 2027 Request ($K)	FY 2028 Request ($K)
NNSA Summary by Appropriation / GPRA Unit				
Federal Salaries and Expenses Appropriation				
Program Direction	560,956	583,940	603,562	616,938
Use of Prior Year Balances	0	0	0	0
Total, Federal Salaries and Expenses	**560,956**	**583,940**	**603,562**	**616,938**
Weapons Activities Appropriation				
Stockpile Management	5,088,367	4,987,070	5,205,630	5,273,947
Production Modernization	5,560,525	5,732,818	5,847,199	6,134,213
Stockpile Research, Technology, and Engineering	3,493,903	3,477,626	3,454,711	3,436,488
Academic Programs and Community Support	172,764	193,860	194,863	202,426
Infrastructure and Operations	2,943,289	3,198,173	3,214,248	3,309,616
Secure Transportation Asset	390,973	413,173	460,641	464,716
Defense Nuclear Security	1,020,469	1,025,445	1,104,450	1,127,885
Information Technology and Cybersecurity	664,374	726,561	763,072	758,664
Legacy Contractor Pensions and Settlement Payments	56,278	64,206	40,869	39,431
Subtotal, Weapons Activities	19,390,942	19,818,932	20,285,683	20,747,386
Use of Prior Year Balances	0	0	0	0
Total, Weapons Activities	**19,390,942**	**19,818,932**	**20,285,683**	**20,747,386**
Defense Nuclear Nonproliferation Appropriation				
Defense Nuclear Nonproliferation Programs				
Material Management and Minimization	440,393	414,702	425,937	454,348
Global Material Security	559,864	542,032	543,806	547,679
Nonproliferation and Arms Control	226,980	230,568	232,435	231,906
Defense Nuclear Nonproliferation R&D	758,450	777,950	768,509	768,607
NNSA Bioassurance Program	30,000	35,000	40,000	50,144
Nonproliferation Construction	102,244	221,122	304,000	286,000
Total, Defense Nuclear Nonproliferation Programs	**2,117,931**	**2,221,374**	**2,314,687**	**2,338,684**
Nuclear Counterterrorism and Incident Response Program	526,275	543,520	558,855	573,324
Legacy Contractor Pensions and Settlement Payments	16,296	20,993	14,128	14,368
Subtotal, Defense Nuclear Nonproliferation Appropriation	2,660,502	2,785,887	2,887,670	2,926,376
Total, Defense Nuclear Nonproliferation Appropriation	**2,660,502**	**2,785,887**	**2,887,670**	**2,926,376**
Naval Reactors Appropriation				
Naval Reactors Programs	2,187,600	2,132,241	2,076,085	2,105,300
Total, Naval Reactors Appropriation	**2,187,600**	**2,132,241**	**2,076,085**	**2,105,300**
Total, National Nuclear Security Administration	**24,800,000**	**25,321,000**	**25,853,000**	**26,396,000**

NNSA Overview

Overview

The FY 2024 Request for **Weapons Activities (WA)** is $18,832,947,000 a $1,716,828,000 (10.0 percent) increase above the FY 2023 Enacted Level.

Programs funded in the Weapons Activities appropriation support the Nation's current and future defense posture and necessary nationwide infrastructure of science, technology, engineering, and production capabilities without resuming underground nuclear explosive testing. Weapons Activities provides for the maintenance and refurbishment of nuclear weapons to continue sustained confidence in their safety, reliability, military effectiveness; investment in scientific, engineering, manufacturing capabilities for certification of the enduring nuclear weapons stockpile; and manufacture of nuclear weapon components. Weapons Activities also provides for maintenance and investment in the National Nuclear Security Administration (NNSA) nuclear complex infrastructure to be more responsive and resilient.

NNSA's Management and Operating (M&Os) partners employ approximately 57,000 people across the enterprise, predominantly at eight geographical sites, including Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), Nevada National Security Site (NNSS), Pantex Plant (PX), Y-12 National Security Complex (Y-12), Kansas City National Security Campus (KCNSC), and Savannah River Site (SRS). NNSA M&O partners are managed by a federal workforce composed of civilian and military staff. Additional details about these programs will be included in the FY 2024 Stockpile Stewardship and Management Plan (SSMP).

NNSA is proposing to restructure the Weapons Activities budget in FY 2024 to elevate Academic Programs from a congressional control level within Stockpile Research, Technology, and Engineering (SRT&E) to a stand-alone Government Results and Performance Act (GPRA) unit. Additionally, NNSA is proposing to establish a Community Capacity Building Program within the same GPRA unit to provide benefits to communities, including Tribal Nations, that are affected by activities at NNSA's sites. The proposed new GPRA unit, titled "Academic Programs and Community Support" enables robust and diverse science, technology, engineering, and mathematics (STEM) research for educational communities through a variety of methods of support. Investments in consortia and centers of excellence provide collaborative groups to tackle large questions through multi-disciplinary approaches, and they leverage preeminent scientists in relevant fields. Research grants and focused investigatory centers support individual principal investigators to foster a vibrant community that is responsive to new breakthroughs by providing flexibility for new ideas, diversity, and career growth.

The FY 2024 Request for **Defense Nuclear Nonproliferation (DNN)** is $2,508,959,000, a $18,959,000 (0.8 percent) increase from the FY 2023 Enacted Level. The includes targeted increases to strengthen key nonproliferation, nuclear and radiological security, and nuclear incident response capabilities necessary to protect the Nation in a world that is more complex geopolitically and technologically. Increases are specifically requested for nuclear power security and safeguards, our Ukraine response, and the bioassurance program.

The Defense Nuclear Nonproliferation (DNN) appropriation funds seven programs to reduce the threats of weapons of mass destruction (WMD). These programs: provide policy and technical leadership to prevent or limit the spread of WMD-related materials, technology, and expertise; develop technologies to detect nuclear proliferation; verify international agreements and arrangements; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; anticipate and detect threats and broaden DOE's role in national biodefense; ensure NEST personnel are trained and equipped to respond to all manner of nuclear and radiological incidents worldwide, including the ability to perform advanced nuclear forensics assessments; and apply a comprehensive and integrated approach to emergency management and continuity of operations to safeguard health and safety, protect the environment, and enhance the resilience of the Department and the Nation.

DOE/NNSA advances the security and safety of the U.S. through three enduring mission pillars: maintaining a safe, secure, and effective nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism; and providing naval nuclear propulsion. As such, the DNN appropriation programs' mission is complementary to the missions of the Office of Defense Programs (DP) and the Office of Naval Reactors (NR). Together, they form the basis for providing a strong nuclear defense strategy. These activities are carried out within a dynamic global security environment, as described in DOE/NNSA's annual reports, the Prevent, Counter, and Respond – A Strategic Plan to Reduce Global Nuclear Threats and the Stockpile Stewardship Management Plan.

The FY 2024 Request for **Naval Reactors (NR)** is $1,964,100,000, a $117,345,000 (5.6 percent) decrease from the FY 2023 Enacted Level. The decrease primarily reflects the revised funding profile for the Spent Fuel Handling Recapitalization Project following the performance baseline change in October 2022. The request will maintain support for the current operational nuclear fleet, continue Columbia-class ballistic missile submarine reactor systems development, research, and development efforts for current and future generations of nuclear-powered warships, and progress on the recapitalization of laboratory facilities and environmental remediation of legacy responsibilities.

The FY 2024 Request for NNSA **Federal Salaries and Expenses (FSE)** is $538,994,000, a $63,994,000 (13.5 percent) increase above the FY 2023 Enacted Level for the salaries, benefits, and the other expenses of 2,006 federal full-time equivalents (FTEs), 1,980 directly paid from FSE and 26 paid through the Working Capital Fund. The increase reflects the funding required for 90 FTE above the FY 2023 projected. The request also provides funding for travel, training, support service contracts, space and occupancy needs, funding for the Department of Energy's (DOE) Working Capital Fund, and other expenses. FSE funds recruiting, training, and retention of federal staff to perform program and project management and oversight of approximately $21.3 billion in Weapons Activities (WA) and Defense Nuclear Nonproliferation (DNN) funding across the nuclear security enterprise.

Highlights and Major Changes in the FY 2023 Request

Stockpile Management - The Stockpile Management program maintains a safe, secure, reliable, and effective nuclear weapons stockpile. The Stockpile Management program encompasses five areas that directly support the Nation's nuclear weapons stockpile. Stockpile Major Modernization will continue Phase 6.6 (*Full-Scale Production*) activities for the B61-12 LEP and W88 ALT 370; continue Phase 6.4 (*Production Engineering*) activities for the W80-4 LEP; continue Phase 6.3 (*Development Engineering*) activities for the W87-1 Modification Program; and continue Phase 2 (*Feasibility Study and Design Options*) for the W93 Program. Stockpile Sustainment will provide activities to include maintenance, limited life component exchanges, minor alterations, surveillance, assessment, surety studies plus capability development, and management activities for each Stockpile System and Multi-Weapon Systems and will continue Phase 6.3 (Development Engineering) activities for the W76-1/2 Mk4B. Weapons Dismantlement and Disposition (WDD) will provide safe and secure dismantlement of nuclear weapons and components in accordance with the Nuclear Weapons Stockpile Plan, and Production Operations (PO) will sustain production-enabling capabilities and capacities, including process improvements and investments focused on increased efficiency of production performance. Nuclear Enterprise Assurance (NEA) will prevent, detect, and mitigate potential consequences of subversion, both to the stockpile and to the associated capabilities to design, produce, and test nuclear weapons.

Production Modernization - The Production Modernization portfolio focuses on the production capabilities for nuclear weapons components critical to weapon performance, including primaries, secondaries, radiation cases, and non-nuclear components. Production Modernization funds the equipment, facilities, and personnel required to reestablish the Nation's capability to produce 80 pits per year (ppy). FY 2024 funding will support process development and qualification activities to produce the first War Reserve (WR) pit at Los Alamos National Laboratory in 2024 and the Plutonium Modernization activities at the Savannah River Site. Production Modernization also supports qualification of explosive, pyrotechnic, and propellant materials for the NNSA's nuclear security enterprise across five sites; implements the program necessary to produce tritium in support of the nuclear weapons stockpile and other national programs; funds modernization of uranium operations, delivery of canned subassemblies and components needed to maintain the stockpile, as well as support to the U.S. nonproliferation and naval nuclear propulsion programs; supports the restart and modernization of lapsed depleted uranium (DU) alloying and component manufacturing capabilities for meeting short- and long-term mission requirements; maintains production of the Nation's enriched lithium supply; and provides funding to modernize production of non-nuclear components required for both the active stockpile and warhead modernization programs.

Stockpile Research, Technology, and Engineering - Stockpile Research, Technology, and Engineering (SRT&E) provides the knowledge and expertise needed to maintain confidence in the nuclear stockpile without the need for underground nuclear explosive testing. The program provides the data and tools that underpin science-based stockpile decisions including assessment and certification. Additionally, it enables the development and maturation of component and manufacturing technologies for future insertion into the stockpile all based on DoD warhead needs, schedules, and requirements for the sustainment of the nuclear security enterprise. The program provides the knowledge and expertise needed to maintain confidence in the nuclear stockpile without the need for underground nuclear explosive testing. Funding requested in FY

2024 supports the continued implementation of the Enhanced Capabilities for Subcritical Experiments (ECSE) and various activities in preparation to accept and operate NNSA's first exascale high-performance computing (HPC) system for unclassified program use starting in late 2023. These two capabilities are needed to support W80-4 LEP design validation and W87-1 Modification certification requirements. In addition, the funding supports the necessary development of the design, engineering, and adaptation of physics and engineering codes needed to support stockpile decisions to operate on this new platform. Funding in this area also supports the development of new materials, technologies, and processes to evolve our nuclear systems and production complex. This is accomplished through warhead component and production technology development and maturation needed for ongoing, planned, and future warhead modernization programs. It also reinvigorates and develops the future generation of the highly trained technical and specialized workforce by experimental and computational programs along with academic institutions. The program includes Assessment Science, Engineering and Integrated Assessments, Inertial Confinement Fusion, Advanced Simulation and Computing, Weapon Technology and Manufacturing Maturation.

Academic Programs and Community Support - This program, formerly a subprogram within the SRT&E portfolio, improves program integration, agility, development, and alignment to critical workforce needs. Academic Programs and Community Support enables robust and diverse science, technology, engineering, and mathematics (STEM) research for educational communities through a variety of methods of support. Investments in consortia and centers of excellence provide collaborative groups to tackle large questions through multi-disciplinary approaches, and they leverage preeminent scientists in relevant fields. Research grants and focused investigatory centers support individual principal investigators to foster a vibrant community that is responsive to new breakthroughs by providing flexibility for new ideas, diversity, and career growth. Specific support to minority and Tribal-serving institutions prepares a diverse workforce of world-class talent through strategic partnerships. Fellowships provide graduate students with key opportunities to connect with the NNSA missions and provide direct experiences at nuclear security enterprise sites. User facilities open opportunities for academic partners to use NNSA's cutting-edge research facilities and push frontiers of current scientific understanding. All Academic Programs and Community Support opportunities focus on quality science through competitive awards, connection with NNSA mission work at national security laboratories and nuclear weapons production facilities, and a view to the nuclear security enterprise's future needs and opportunities.

Infrastructure and Operations (I&O) - The Infrastructure and Operations program maintains, operates, and modernizes NNSA's infrastructure in a safe, secure, and cost-effective manner to support program execution while seeking to maximize return on investment and reduce enterprise risk. The program also plans, prioritizes, and constructs facilities and infrastructure to support all NNSA programs including DOE owned federal Field Offices, except for programmatic construction projects which are funded by the capability sponsor. Infrastructure and Operations consists of the following programs: Operations of Facilities, Safety and Environmental Operations, Maintenance and Repair of Facilities, Recapitalization, and Line-Item Construction Projects. The FY 2024 Budget Request for Infrastructure and Operations will enable NNSA to operate and modernize NNSA's infrastructure to support expanded mission objectives and future enterprise resilience including support for the Kansas City Non-Nuclear Expansion Transformation (KCNExT) plan. Funding is also requested for NNSA's share of operations and maintenance costs of DOE-EM facilities at the Savannah River National Laboratory, and to initiate three new mission enabling construction projects: TA-46 Protective Force Facility project at LANL, Plutonium Production Building project at LANL, and Analytic Gas Laboratory project at Pantex. The Request for Operations of Facilities and Safety and Environmental Operations was adjusted to reduce uncosted balances.

Secure Transportation Asset - The Secure Transportation Asset (STA) supports safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material throughout the Nuclear Security Enterprise (NSE). Nuclear weapon life-extension programs, limited-life component exchanges, surveillance, dismantlement, nonproliferation activities, and experimental programs rely on STA activities to ensure safe, secure, and on-schedule transport. The FY 2024 Request supports modernizing and sustaining STA transportation assets, including life extension of the Safeguards Transporter until it is replaced by the Mobile Guardian Transporter; vehicle sustainment; replacement armored tractors, escort, and support vehicles; upgrades of the Tractor Control Unit to accommodate for communications and security; and continued development and testing of the Mobile Guardian Transporter. The first Mobile Guardian Transporter production unit is planned for completion in FY 2028 and will begin a phased in approach to replace the current Safeguard Transporter. Program Direction resources in this account provide salaries and expenses for the secure transportation workforce, including Federal Agents. Strategies to attract, hire, and maintain the Federal Agent workforce are being implemented to support and increase end strength. Initiatives include increasing starting salary, offering recruitment incentives, and creating ladder positions.

Defense Nuclear Security (DNS) - DNS provides protection for NNSA personnel, facilities, nuclear weapons, and materials from a full spectrum of threats, ranging from minor security threats to acts of terrorism, at its national laboratories, production plants, processing facilities, and the Nevada National Security Site (NNSS). Employing more than 1,700 Protective Force officers, DNS secures more than 5,000 buildings and protects more than 57,000 personnel. The FY 2024 request includes funding to fill positions in key security program areas required to implement a risk-based, layered protection strategy at the sites. The request also supports increased security needs associated with known mission growth in weapons programs across the NSE, including Pit Production at Los Alamos National Laboratory. The FY 2024 request also reflects support for development and implementation of the Caerus security system, Security Infrastructure Revitalization Program (SIRP) projects, the Physical Security Center of Excellence (PSCOE), and the Center for Security Technology, Analysis, Response, and Testing (CSTART), as well as funding for the WEPAR project, which will install a new Perimeter Intrusion Detection and Assessment System (PIDAS) section, thus reducing the Y-12 National Security Complex (Y-12) Protected Area by approximately 50% while integrating with the UPF.

Information Technology (IT) and Cybersecurity -
The NNSA IT and Cybersecurity Program focuses on the development of integrated IT initiatives that provide an effective technology infrastructure to support the Nuclear Security Enterprise (NSE) shared services. These initiatives will fundamentally redesign the NNSA IT and cybersecurity environments to provide a more secure and agile set of capabilities including unified communication, agile cloud infrastructure, and next-generation collaboration services across the NSE. The approach will provide commodity services that can be used in the future with NNSA Management and Operating (M&O) partners to improve the security of sensitive NNSA data and host shared services. Additionally, the NNSA IT and Cybersecurity Program will create a plan to explore IT application capabilities, operational technology, machine learning, and artificial intelligence to implement tools and capabilities to secure future NNSA operations. The FY 2024 budget request supports the Department's proactive and strategic approach to protect and harden NNSA's IT infrastructure against cyber threats, enhances cybersecurity capabilities, cloud-based technologies, and IT modernization and infrastructure to support NNSA's mission.

Defense Nuclear Nonproliferation
The FY 2024 Request continues DNN's efforts to reduce the danger of hostile nations or terrorist groups acquiring nuclear devices, radiological dispersal devices, weapons-usable material, nuclear and dual-use commodities and technology, or nuclear-related expertise. These programs: provide policy and technical leadership to prevent or limit the spread of WMD-related materials, technology, and expertise; develop technologies to detect nuclear proliferation; verify international agreements and arrangements; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; anticipate and detect threats and broaden DOE's role in national biodefense; ensure NEST personnel are trained and equipped to respond to all manner of nuclear and radiological incidents worldwide, including the ability to perform advanced nuclear forensics assessments; and apply a comprehensive and integrated approach to emergency management and continuity of operations to safeguard health and safety, protect the environment, and enhance the resilience of the Department and the Nation.

Material Management and Minimization (M3) - M3 programs reduce and, when possible, eliminate weapons-usable nuclear material around the world to achieve permanent threat reduction. The FY 2024 Budget Request supports the conversion or shutdown of research reactors and isotope production facilities that use highly enriched uranium (HEU), the qualification of new low-enriched uranium (LEU) fuels, the support of non-HEU-based molybdenum-99 (Mo-99) production facilities in the U.S., the optimization of proliferation resistance in reactor designs, the high-assay low-enriched uranium (HALEU) recovery project and recovery of HALEU from a foreign partner, the removal and disposal of weapons-usable nuclear material, activities to disposition plutonium from the state of South Carolina, implementation of the dilute and dispose strategy for plutonium disposition, and downblending HEU.

Global Material Security (GMS) - GMS directly contributes to national security efforts to reduce global nuclear and radiological security threats. The FY 2024 Budget Request supports programs to prevent terrorists and other actors from obtaining nuclear and radioactive material to use in an improvised nuclear device (IND) or a radiological dispersal device (RDD) by working domestically and with partner countries to improve the security of vulnerable materials and facilities and to build partners' capacity to detect, disrupt, and investigate illicit trafficking of these materials. GMS works with countries in bilateral partnerships, and with multilateral partners such as the International Atomic Energy Agency (IAEA), the Global Initiative to Combat Nuclear Terrorism (GICNT), the World Customs Organization (WCO), the United Nations Office on Drugs and Crime (UNODC), and INTERPOL. As part of an ongoing strategic analysis process, GMS continues to explore and integrate innovative approaches, technologies, and tools to adapt to emerging threats. GMS has and will continue to support its partners in Ukraine in maintaining and, where possible, rebuilding their capabilities to secure nuclear and radioactive facilities and materials, and detect smuggling of these materials within Ukraine. GMS supports U.S. national security priorities to reduce global nuclear security threats and sustain access to needed peaceful applications of nuclear technology that support climate change, energy security, and global health priorities.

Nonproliferation and Arms Control (NPAC) - NPAC programs contribute to standing DOE/NNSA statutory and treaty/agreement obligations and authorities, prevent nuclear and dual-use technology from being exploited or diverted by adversaries, identify emerging technologies of potential proliferation concern, and consider ways to mitigate them. NPAC programs also strengthen the international nuclear safeguards regime and the IAEA's ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance or illicit diversion of materials, reduce proliferation concerns by enabling verifiable arms reductions, and support negotiation and implementation of U.S. nonproliferation and arms control treaties and agreements, while upholding U.S. requirements for maintaining a safe, secure, and reliable nuclear weapons stockpile are met. The FY 2024 Budget Request supports IAEA and partner countries' efforts to implement international safeguards obligations, builds domestic and international capacity to implement export control obligations, supports the negotiation and implementation of agreements and associated monitoring regimes to verifiably reduce nuclear weapons and nuclear programs, continues development of the Arms Control Advancement Initiative (ACAI) including detailed planning for construction related to the high-fidelity verification user facility, and develops approaches and strategies to address emerging nonproliferation and arms control challenges and opportunities. NPAC provides export control and safeguards training to Ukraine to promote safeguards implementation and strengthen its national export control systems to help prevent illicit trafficking in nuclear and WMD-related materials, commodities, and technology.

Defense Nuclear Nonproliferation Research and Development (DNN R&D) - DNN R&D directly contributes to nuclear security by developing U.S. capabilities to detect and characterize global nuclear security threats in full coordination with the goals and priorities of U.S. Government mission stakeholders across nonproliferation, counterterrorism, and emergency response mission areas. In addition, DNN R&D sustains and develops foundational nonproliferation technical capabilities that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats. To achieve its goals, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research and demonstrate advances in capabilities, develop prototypes, and produce sensors for integration into operational systems. The FY 2024 Budget Request supports planned activities for the early detection of proliferation-related R&D and continued production of nuclear detonation detection satellite payloads. The request also supports continued efforts to sustain and develop foundational nonproliferation technical capabilities by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce. Additionally, it continues to develop and maintain advanced technical nuclear forensics analysis capabilities at the U.S. national laboratories that can support time-critical decisions in the event of a nuclear or radiological incident and assist in determining the origin of interdicted materials or nuclear devices.

DOE/NNSA Bioassurance Program - The DOE/NNSA Bioassurance Program develops U.S. national laboratory capabilities to anticipate, detect, assess, and mitigate emerging biothreats and strengthen biodefense. The program develops core capabilities at the U.S. national laboratories, such as high-performance computing for accelerated threat assessment and rapid countermeasure design, surveillance and detection capabilities, safeguards and export controls, and forensics to support attribution. The Bioassurance program uniquely provides long-term capability stewardship that enables other departments and agencies in biodefense to satisfy their own, agency-specific mission requirements, as part of the overall strategically guided effort. The FY 2024 Budget Request develops the initial operating capability and coordinated DOE program in biosciences, including phased science plan implementation with exploratory research, facility upgrades, and minor equipment purchases.

Nonproliferation Construction - Nonproliferation Construction consolidates construction costs for DNN projects. Currently, one project that will support the dilute and dispose strategy for surplus plutonium disposition resides within the Material Management and Minimization program. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the Savannah River Site to accelerate plutonium dilution and aid in the removal of plutonium from the state of South Carolina. The FY 2024 Budget Request supports completing the final design review and activities to request CD-2/3, *Approval of Performance Baseline and Start of Construction*, to initiate full construction on the SPD project.

Nuclear Counterterrorism and Incident Response Program (NCTIR) - The NCTIR program sustains the U.S. nuclear counterterrorism and counterproliferation activities as well as operational nuclear incident response capabilities while supporting DOE's all-hazards emergency management system. The CTCP subprogram provides the Nation's technical capability to understand and defeat nuclear devices, including INDs and lost or stolen foreign nuclear weapons. This knowledge in turn informs U.S. Government policies, regulations, and key Department of Defense (DoD) mission partners on terrorist and proliferant state nuclear threats and related contingency planning. In support of the nuclear counterterrorism mission, the FY 2024 Budget Request for NCTIR supports programs to manage and deploy the DOE/NNSA NEST, comprised of scientific and technical experts who are trained and equipped to respond rapidly to nuclear or radiological incidents and accidents worldwide. NEST includes scientific nuclear forensics capabilities which support identifying the origin of nuclear material interdicted outside of regulatory control or used in a nuclear attack. Additionally, CTCP educates international partners to respond effectively to nuclear or radiological incidents in their countries. Finally, CTCP integrates DOE/NNSA policy, planning, and operations on counterproliferation priorities, supporting urgent needs, and proactively pursuing opportunities to prevent nuclear threats and develop technologies to apply to the counterproliferation mission.

Additionally, NCTIR executes the Emergency Operations (EO) subprogram. The EO subprogram provides the structure and processes to support a comprehensive and integrated approach to all-hazards emergency management. The EO subprogram improves the readiness and effectiveness of the DOE Emergency Management System and the NSE on a programmatic and performance level to deal with all types of emergencies impacting the DOE/NNSA enterprise or its equities anywhere in the world. This promotes unity of effort and a culture of continuous improvement to safeguard the health and safety of workers and the public, protect the environment, and enhance the resilience of the Department and the Nation.

Naval Reactors

The FY 2024 Request supports continued safe and reliable operation of the Navy's nuclear-powered fleet (68 submarines, 11 aircraft carriers, and 5 research, development, and training platforms). The Program's development work consists of refining and improving existing technology to ensure that the U.S. Navy's nuclear propulsion plants are increasingly efficient and effective and will be capable of meeting future threats to national security. In addition to supporting the existing nuclear fleet, NR has two major DOE initiatives—the *Columbia*-Class Reactor System Development, and the Spent Fuel Handling Recapitalization Project (SFHP).

Funding is also requested for the program direction account for NR federal employees who directly oversee and set policies and procedures for developing new reactor plants, operating existing reactor plants, facilities supporting these plants, contractors, and the Bettis and Knolls Atomic Power Laboratories. The Request includes continued reinvestment in unique technologies used in naval reactors that are crucial to delivering superior navy fleet operations and dominance in the maritime domain, modernization of infrastructure, and remediation of environmental liabilities as well as funding for the SFHP that has recently re-baselined, in addition to two new start construction projects at the Naval Reactors Facility and Knolls sites.

NNSA Federal Salaries and Expenses

The FY 2024 Request builds upon ongoing efforts to improve the effectiveness and efficiency of NNSA federal oversight and to meet current and future workforce needs. The growth in the FSE account will support 2,006 Federal Full-time Equivalents (FTEs) which is 90 FTE above the FY 2023 projected. The request includes 1,980 FTEs paid from FSE and 26 paid through the Working Capital Fund. The NNSA workforce is critical to the success of the Nation's nuclear security enterprise. The right number of people, with the right skills, in the right positions is key to the growing mission including modernizing the nuclear deterrent, recapitalizing the aging infrastructure, and continuing to meet the requirements of nonproliferation and counterterrorism programs. NNSA will use a variety of innovative methods to grow and shape the professional staff including recruitment events and available excepted service hiring authority. The NNSA will also continue to monitor the evolving need for federal oversight in support of the nuclear modernization missions and adjust future staffing plans accordingly. NNSA will also use partnerships with academic alliances to grow the workforce with early identification and recruitment of top science, technology, engineering, and math talent.

Entry Level Hires: The NNSA supports a variety of programs to help train and recruit the next generation of leaders in managing the nuclear stockpile, nonproliferation, nuclear security, and international security, such as the NNSA Graduate Fellowship Program (NGFP), the Minority Serving Institutions Partnership Program (MSIPP), and the Presidential Management Fellows (PMF) program. These programs foster the pipeline of qualified professionals who will sustain expertise in these areas through future employment in the NNSA NSE.

DOE Working Capital Fund (WCF) Support

NNSA's Total FY 2024 Request includes $76,028,000 for NNSA's projected support to the DOE WCF. Of this amount, $36,129,000 will be paid out of FSE; $32,994,000 out of WA; $4,396,000 out of DNN; and $2,509,000 out of NR. This funding covers selected shared enterprise activities including managing enterprise-wide systems and data, telecommunications, and supporting the integrated acquisition environment. There are differences between NNSA's budget for WCF and the amounts allocated to NNSA in the WCF budget included in Volume 2. These differences will be addressed during execution of the FY 2024 budget.

Legacy Contractor Pensions and Settlement Payments

These budget lines included in the WA and DNN accounts include funding for the Requa settlement reached in 2019 as well as a portion of an unfunded pension liability at the Savannah River Site in addition to DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL).

The *Requa* lawsuit involved UC employees of LLNL who retired prior to the Laboratory's transition to a new contractor on October 1, 2007. The retirees had been receiving health insurance through a UC health plan but when the LLNL contract transitioned to LLNS, the employees were offered health insurance through the new LLNL contractor, leading the retirees to file a lawsuit seeking reinstatement into the UC health plan. The parties settled the lawsuit in 2019, and a final judgment was issued in April 2020. DOE/NNSA agreed, pursuant to the legacy UC-LLNL Contract, to provide UC a portion of the total costs to settle the lawsuit, over a period of seven years through FY 2026. DOE/NNSA's responsibility for FY 2024 is $9,000,000.

Funding is also requested for reimbursement of NNSA's portion of the unfunded liability of the Savannah River Nuclear Solutions pensions plan. The NNSA FY 2024 Request includes up to $43,932,000 for this liability; NNSA's portion is allocated between the DNN and Weapons Activities appropriation accounts.

These budget lines also continue to include DOE/NNSA's annual reimbursement made to the UCRP for former UC employees and annuitants who worked at the LLNL and LANL. The annual reimbursement is based on the actuarial valuation report and an annual assessment provided by UC and is covered by the terms described in the contracts. The Request includes a total of $49,400,000.

These requirements will be partially funded with prior year balances.

Site Estimates

($K)

Site	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request				
			FSE	WA	DNN	NR	Total
Argonne National Laboratory	56,016	69,990	1,200	5,143	53,377	-	59,720
Battelle Savannah River Alliance	1,638	5,351	-	2,299	-	-	2,299
Bettis Atomic Power Laboratory	419,208	630,863	-	-	-	580,166	580,166
Brookhaven National Laboratory	19,271	15,963	7	525	15,087	-	15,619
Carlsbad Area Office	1	1	1	-	-	-	1
Chicago Operations Office	7	7	7	-	-	-	7
Consolidated Business Center	-	60	-	-	-	-	-
Fermi National Accelerator Laboratory	760	843	-	-	864	-	864
Idaho National Laboratory	188,277	211,543	1	2,755	122,687	92,800	218,243
Kansas City National Security Complex (KCNS	1,357,216	1,195,893	-	1,230,942	54,158	-	1,285,100
Kansas City Site Office	10,552	12,910	9,673	-	2,570	-	12,243
Knolls Atomic Power Laboratory	759,012	638,791	-	-	-	765,520	765,520
Lawrence Berkeley National Laboratory	17,469	13,927	-	610	11,403	-	12,013
Lawrence Livermore National Laboratory	2,196,310	2,199,858	1,100	1,987,921	236,845	-	2,225,866
Livermore Site Office	17,644	36,040	20,340	-	-	-	20,340
Los Alamos National Laboratory	3,445,510	3,999,598	-	4,053,066	450,997	-	4,504,063
Los Alamos Site Office	19,550	22,947	23,545	27	-	-	23,572
Naval Reactors Facility	582,150	636,879	-	-	-	447,064	447,064
Naval Reactors Laboratory Field Office	16,485	16,791	-	-	-	17,460	17,460
Naval Research Laboratory	9,000	9,300	-	4,500	-	-	4,500
NETL Pittsburgh	53,795	55,655	125	18,289	1,535	-	19,949
Nevada Field Office	18,289	20,330	19,768	1,560	75	-	21,403
Nevada National Security Site	764,578	673,620	3	755,516	105,506	-	861,025
NNSA Albuquerque Complex	1,154,992	1,569,300	660	1,108,508	186,184	-	1,295,352
NNSA Production Office (NPO)	48,640	60,418	35,539	22,800	37,090	-	95,429
Oak Ridge Institute for Science & Education	5,067	5,901	-	2,000	3,793	-	5,793
Oak Ridge National Laboratory	166,560	271,458	7	128,479	169,466	-	297,952
Office of Scientific & Technical Information	562	739	-	664	73	-	737
Pacific Northwest National Laboratory	402,139	363,020	1,532	82,187	257,334	-	341,053
Pantex Plant	952,395	1,058,213	-	1,195,729	13,066	-	1,208,795
Portsmouth Gaseous Diffusion Plant	-	40,000	-	60,000	-	-	60,000
Princeton Plasma Physics Laboratory	925	855	-	-	876	-	876
Richland Operations Office	2,258	1,708	7	-	3,020	-	3,027
Sandia National Laboratories - New Mexico	2,660,172	2,774,322	-	2,681,391	265,181	-	2,946,572
Sandia Site Office	85,250	86,269	27,283	-	61,607	-	88,890
Savannah River National Laboratory	-	-	-	42,000	-	-	42,000
Savannah River Operations Office	39,423	32,179	11,621	24,529	16,788	-	52,938
Savannah River Site	1,314,721	1,909,291	-	1,346,793	154,658	-	1,501,451
SLAC National Accelerator Laboratory	1,855	3,088	-	180	1,993	-	2,173
Thomas Jefferson National Accelerator Facilit	80	-	-	-	-	-	-
University of Rochester	83,000	86,100	-	89,000	-	-	89,000
Washington Headquarters	1,674,279	2,057,992	386,575	1,562,094	192,942	61,090	2,202,701
Waste Isolation Pilot Plant	10,558	9,160	-	-	15,064	-	15,064
Y-12 National Security Complex	2,100,386	1,901,244	-	2,485,012	94,720	-	2,579,732
Adjustments	-	(535,852)	-	(61,572)	(20,000)	-	(81,572)
Grand Total	**20,656,000**	**22,162,564**	**538,994**	**18,832,947**	**2,508,959**	**1,964,100**	**23,845,000**

[a] Contains only SRNL Operations & Maintenance funding.

Cybersecurity Details
National Institute of Science and Technology Category

NNSA prioritizes investments in cybersecurity and IT that fully support the NNSA mission across the enterprise and improve cybersecurity and IT performance, resiliency, and response. These investments align to the Administration's priorities for cybersecurity and technology modernization. The table below breaks out cybersecurity funding across NNSA by National Institute of Standards and Technology category.

($K)

	FY 2022 Enacted	FY 2023 Enacted[a]	FY2024 Request
Detect	48,360	37,361	51,640
Naval Reactors	1,325	1,481	1,532
Weapons Activities	47,034	35,881	50,109
Identify	89,154	68,574	95,172
Naval Reactors	1,413	1,640	1,696
Weapons Activities	87,740	66,934	93,476
Protect	165,165	126,567	175,841
Naval Reactors	2,568	2,527	2,615
Weapons Activities	162,597	124,039	173,226
Recover	2,691	2,151	2,829
Naval Reactors	506	484	501
Weapons Activities	2,185	1,667	2,328
Respond	27,795	21,585	29,681
Naval Reactors	1,179	1,281	1,325
Weapons Activities	26,616	20,304	28,356
Total NNSA	333,164	256,238	355,163

[a] The reduction from FY 2022 to FY 2023 reflects the use of a new definition for what qualifies as cybersecurity.

Notification and Use of Minor Construction Authority

Authorities:

50 US Code 2743(b) requires an annual report on each exercise of minor construction authority. As a result of addressing all minor construction, this report also includes all project information requested in the FY 2018 National Defense Authorization Act.

Additionally, pursuant to 50 US Code 2743(d), this report notifies all minor construction projects, as indicated by checkmark, having a total estimated cost of more than $5 million planned for execution.

Finally, 50 US Code 2746(b) requires that if the total estimated cost for construction design in connection with any construction project exceeds $5,000,000, funds for that design must be specifically authorized by law. NNSA requests Congressional authorization for those minor construction projects, as indicated by checkmark, that are estimated to exceed the $5,000,000 design threshold.

Percent Complete:

NNSA is developing a standardized calculation for Percent Complete to be shared/used for future Congressional Budget Request cycles, which will include indirect projects. For this report, percentages in the column represents each program's perspective of percent complete.

See **Abbreviations** list (end of document).

Icon Key:

- Project starting its notification and wait period.

- Provisional Notification – Project is planned to start within the FY 2024-2028 FYNSP period. NNSA may accelerate or delay these projects to address emerging changes in priorities and unplanned infrastructure failures.

- Fix reporting or notification. Usually, reclassifying previously characterized MIE (personal property), as MC (related personal property).

Minor Construction (MC) Reporting & Notification
($K)

								Original			Current							
Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	SRT&E	**NA**	**MC (TEC <$5M)**	**NA**			NA	NA	NA	NA	21,136	22,679	24,244	25,369	25,901	26,445	27,001	NA
							0%	FY 2025	FY 2025	FY 2026	FY 2025	FY 2025	FY 2026					
WA	SRT&E	LANL	ATS-5 Cooling Installation	As originally notified			18,000	18,000	500	0	0	0	0	500	17,500	0	0	0
							0%	FY 2025	FY 2025	FY 2026	FY 2025	FY 2025	FY 2026					
WA	SRT&E	LANL	ATS-5 Electrical Installation	As originally notified			12,000	12,000	500	0	0	0	0	500	11,500	0	0	0
					✓	✓	0%	FY 2023	FY 2023	FY 2026	FY 2023	FY 2023	FY 2026					
WA	SRT&E	LLNL	3w Power Sensors	Replace power sensor fiber with robust equivalent, capable of tolerating higher levels of neutron exposure. Design and implement existing power sensor design on remaining 144 beams of NIF.			19,900	19,900	5,000	0	0	0	5,000	14,900	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
WA	SRT&E	LLNL	Bldg 453 Sierra Retirement	Sierra, the ATS-2 computing system, will be at the end of its useful life. The project scope includes all decommissioning activities, including disassembly and removal of system and associated cooling and electrical components.			10,000	10,000	1,000	0	0	0	10,000	0	0	0	0	0

($K)

Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Original Project Start	Original Design Complete	Original Constr. Complete	Current Project Start	Current Design Complete	Current Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
			⌛		✓		0%	NA	NA	FY 2024	NA	NA	FY 2024					
WA	SRT&E	LLNL	Bldg 453 Tuolumne Site Prep	Complete Site Infrastructure Project design and construction for Tuolumne, the unclassified analog to El Capitan in B-453.			6,000	6,000	3,000	0	0	3,000	3,000	0	0	0	0	0
			⌛		✓		0%	FY 2023	FY 2023	FY 2026	FY 2023	FY 2023	FY 2026					
WA	SRT&E	LLNL	Blue Blockers	Design, fabricate, and deploy new 128 'blue blockers' systems to inhibit reverse propagating light (source of debris generation)			18,400	18,400	2,300	-	-	2,300	0	16,100	0	0	0	0
			🔧 ⌛		✓		0%	NA	NA	FY 2023	NA	NA	FY 2023					
WA	SRT&E	LLNL	High Fidelity Pulse Shaping (previously NIF Master Oscillator Recapitaliza-tion)	Replace current pulse shaping system components with higher stability equivalents and modernize the pulse-shaping diagnostic by replacing the current obsolete digitizers with equivalent low-profile, higher signal-to-noise digitizers.			9,025	9,025	0	0	9,025	0	0	0	0	0	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	NA	NA	FY 2026	NA	NA	FY 2027					
WA	SRT&E	LLNL	Neutron Imaging System Polar (previously NIS Equator 90-213)	A 2-phase project to provide a third neutron imaging line-of-sight on NIF, with the first phase providing unscattered (time-integrated) and second phase providing downscattered (time-resolved) images of the compressed NIF fuel.			6,700	6,700	2,000	0	0	6,700	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2027					
WA	SRT&E	LLNL	NIF High Resolution, neutron-hardened VISAR	A modification to the existing NIF Line VISAR system that adds 2D time gated imaging to improve the accuracy of velocity measurements and provides neutron shielding for the interferometer electronics.			7,230	7,230	1,700	1,700	0	0	5,530	0	0	0	0	0
							10%	FY 2020	FY 2021	FY 2022	FY 2020	FY 2023	FY 2026					
WA	SRT&E	NNSS	Z-Pinch Experimental Underground System (ZEUS) Test Bed Facility Improvements (ZTBFI) (previously U1a.03 Test Bed Facility Improvements)[a]	As originally notified			16,000	122,946	4,692	18,754	12,736	12,956	78,500	0	0	0	0	0

[ah] Pursuant to 50 U.S.C. 2743(c), NNSA will not obligate more than $30,000k of TEC funding until formal submission to the congressional defense committees of a report explaining the reasons for the cost variation above the Minor Construction threshold. $7,000k of FY 2022 funding carryover will be obligated in FY 2023. This project is proposed to be converted to a Line-Item Construction project in the FY 2024 budget.

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							0%	NA	NA	FY 2022	NA	NA	FY 2024					
WA	SRT&E	SNL	4MW Power Upgrade for 725 HPC Facility	As originally notified			5,500	8,000	0	0	5,000	3,000	0	0	0	0	0	0
							0%	NA	NA	FY 2024	NA	NA	FY 2024					
WA	SRT&E	SNL	725E Cooling Capacity Expansion	As originally notified			9,500	9,600	100	-	100	5,300	4,200	0	0	0	0	0
					✓	✓	0%	FY 2024	FY 2024	FY 2026	FY2024	FY 2024	FY 2026					
WA	SRT&E	LLNL	Beam Blockers	Design and implement replacement systems at NIF to allow tailoring of the blockers on a single beam basis thereby reducing deployed blockers and provide sufficient flexibility to ensure the current optics refurbishment rate is sustainably maintained below capacity			28,000	28,000	7,000	0	0	0	7,000	21,000	0	0	0	0
WA	**SRT&E**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**47,997**	**55,935**	**137,474**	**78,369**	**54,901**	**26,445**	**27,001**	**NA**
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	SM	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	47,827	51,318	54,859	57,405	58,610	59,841	61,098	NA
					✓		0%	NA	NA	FY 2024	NA	NA	FY 2025					
WA	SM	LLNL	⌛ Dynamic Test Laboratory	Modular construction to provide expanded testing capacity for W87-1's new LX-17 main charge production. Building number assigned after construction completion.			6,000	6,000	600	0	0	6,000	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							83%	NA	NA	FY 2022	NA	NA	FY 2023					
WA	SM	PX	12-44, Cell 8	As originally notified			8,000	8,000	1,000	5,023	2,977	0	0	0	0	0	0	0
							0%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	SM	PX	12-64 Bays 11, 12 & 15 Replacement Facilities	As originally notified			5,283	5,283	1,300	0	0	0	1,300	3,983	0	0	0	0
							20%	FY 2021	FY 2022	FY 2023	FY2021	FY 2022	FY 2023					
WA	SM	SNL	SNL CA High Security Office Modular Addition	As originally notified			7,800	14,500	800	7,800	5,700	1,000	0	0	0	0	0	0
							60%	NA	NA	FY 2023	NA	NA	FY 2025					
WA	SM	SRS	Mass Spec Replacement Project #1A: New Inert Mass Spec (New MS #5) 234-H Room 301	As originally notified			5,500	9,000	1,500	4,500	0	4,500	0	0	0	0	0	0
							35%	FY 2021	FY 2021	FY 2023	FY2021	FY 2021	FY 2024					
WA	SM	Y-12	9990-03 Facility Upgrades	As originally notified			19,952	19,952	1,750	1,750	18,202	0	0	0	0	0	0	0
							9%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	SM	Y-12	Building 9201-1 Pangborn Upgrades	As originally notified			5,000	6,000	300	2,000	4,000	0	0	0	0	0	0	0
WA	**SM**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**78,706**	**62,818**	**56,159**	**61,388**	**58,610**	**59,841**	**61,098**	**NA**
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	PM	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	27,160	27,757	28,368	28,992	29,630	30,282	30,948	NA
							35%	NA	NA	FY 2024	NA	NA	FY 2024					
WA	PM	LANL	Establish IT Production Infrastructure @ TA-55	As originally notified			6,500	6,500	500	2,500	2,000	2,000	0	0	0	0	0	0
							10%	FY 2021	FY2021	FY 2024	FY 2022	FY2025	FY 2026					
WA	PM	LANL	Shipping & Receiving (Exterior)	As originally notified			12,500	9,161	3,500	0	1,541	0	0	7,620	0	0	0	0

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							60%	FY 2021	FY 2021	FY 2024	FY 2022	FY 2023	FY 2024					
WA	PM	LANL	Increase Positive Personal Identity Verification (PPIV) Booth Capacity (East Entry Control Facility)	Increase PPIV booth capacity at east Entry Control Facility at TA-55.			12,000	9,000	500	0	9,000	0	0	0	0	0	0	0
					✓		10%	NA	NA	FY 2023	NA	NA	FY 2025					
WA	PM	LANL	PF-4 Relocated Vault Administrative Area	Reconfiguration and repurposing to support the increased pit mission. Provides increased staging for pit manufacturing.			5,296	9,300	1,200	0	6,673	2,627	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2029	NA	NA	FY 2029					
WA	PM	LANL	Standards and Cal: Demo and Installation of a Mod Lab for Coordinate Measuring Machine	Standards and Cal: Demo and Installation of a Mod Lab for Coordinate Measuring Machine (CMM).			8,200	8,200	1,900	0	0	0	0	0	0	1,900	6,300	0
					✓		0%	FY2025	FY2026	FY2028	FY2025	FY2026	FY2028					
WA	PM	LANL	Modifications to the Inert Gas System in PF-4	The gas distribution system contains soft solder joints and other components that result in the loss of gasses within the system upon distribution. This project will replace these components and modernize this system.			20,000	20,000	1,900	0	0	0	0	1,900	18,100	0	0	0

								($K) Original			Current							
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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	FY 2022	FY 2023	FY 2023	FY 2022	FY 2023	FY 2025					
WA	PM	LLNL	Quench furnace infrastructure and space buildout	As originally notified			10,500	10,500	-	0	10,500	0	0	0	0	0	0	0
							5%	FY 2023	FY 2023	FY 2024	FY 2023	FY 2024	FY 2025					
WA	PM	NNSS	DAF Glovebox Exhaust System for expanded glovebox operations	As originally notified			10,000	20,700	-	0	0	20,700	0	0	0	0	0	0
							10%	NA	NA	FY 2022	NA	NA	FY 2025					
WA	PM	NNSS	DAF Deployment Project	As originally notified			6,378	8,525	430	4,125	4,400	0	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	PM	NNSS	Certified Packaging Center Replacement	Facility to accommodate RMS Test Bed, prototype rack system, and fissile material handling operations.			5,000	5,000	500	0	0	0	5,000	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	PNNL	⌛ 325RPL (Radiochemical Processing Laboratory) Electrical Upgrade	Work to increase the electrical capacity to the facility. Upgrades will require additional power feed(s) (i.e., normal, standby) from the commercial provider and will likely include electrical equipment such as transformers, panel boards, lighting panels, motor control centers, controls, and transfer switches.			17,250	17,250	2,200	0	0	17,250	0	0	0	0	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	PNNL	325RPL (Radiochemical Processing Laboratory) Plutonium-Tritium Processing Lab Upgrade	Several labs will be combined into a single laboratory space to support plutonium processing research specifically the Laboratory-Scale Plutonium Oxide test platform and a new Laboratory-Scale Fluorination System providing new capability to perform fluorination at a complementary scale.			6,500	6,500	900	0	0	6,500	0	0	0	0	0	0
					✓		0%	FY 2023	FY 2023	FY 2025	FY 2023	FY 2023	FY 2025					
WA	PM	PNNL	325RPL (Radiochemical Processing Laboratory) Plutonium Metal Glovebox Laboratory Upgrade	Renovation of laboratory spaces will establish a new capability to perform fundamental research on plutonium metal and provide a training and mockup glove box for new systems and process development. To make room for this new capability, current laboratory space supporting core TTP tritium measurements will be redesigned, relocated, and modernized.			11,100	11,100	700	0	0	700	10,400	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	NA	NA	FY 2028	NA	NA	FY 2028					
WA	PM	PNNL	325RPL (Radiochemical Processing Laboratory) Mass Spectrometry and Solvent Extraction Laboratory Upgrade	Infrastructure upgrades for new research capability to install laboratory-scale pulse columns. The mass spectrometry laboratory will be expanded to provide better air flow, temperature stability, while consolidating mass spectrometry instrumentation. Office space will be converted for radiological laboratory space with laboratory space being modernized for nuclear archaeology testing.			8,950	8,950	900	0	0	0	0	0	8,950	0	0	0
					✓		0%	FY 2026	FY 2026	FY 2028	FY 2026	FY 2026	FY 2028					
WA	PM	PNNL	325RPL (Radiochemical Processing Laboratory) Tritium and Microscopy Laboratory Upgrade	Consolidate and modernize microscopy laboratory space for both uranium and tritium microscopy preparation with dedicated space for microscopy preparation of uranium and tritium samples, providing a larger single laboratory to support molten salt and salt processing missions.			10,700	10,700	700	0	0	0	0	0	700	10,000	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
WA	PM	PNNL	325RPL (Radiochemical Processing Laboratory) Impacted Laboratory Upgrade	Expand small laboratory spaces to provide a modern laboratory with glovebox capability to support increasing needs for uranium and salt processing. A storage location is converted to a new, modern instrument laboratory.	✓		0%	NA	NA	FY 2029	NA	NA	FY 2029					
							9,900	9,900	900	0	0	0	0	0	0	0	9,900	0
WA	PM	PX	Heat Treat Oven	Associated minor construction project to modify the facility to accept the Heat Treat Oven production tool.			0%	NA	NA	FY 2025	NA	NA	FY 2025					
							Under $5M	5,839	1,000	0	1,300	4,539	0	0	0	0	0	0
WA	PM	SNL	Reliable Dry Room Installation and Li Battery Pack Rapid Prototyping Lab Installation	As originally notified			15%	FY 2019	FY 2019	FY 2020	FY 2021	FY 2022	FY 2024					
							12,000	18,100	1,100	12,000	6,100	0	0	0	0	0	0	0
WA	PM	SRS	Install Mini-TCAP in TEF	As originally notified			0%	FY 2022	FY 2023	FY 2027	FY 2026	FY 2027	FY 2029					
							15,645	15,645	2,500	0	0	0	0	0	2,500	0	13,145	0
WA	PM	SRS	Redesign TEF Mass Spec 4 Location and purchase new Mass Spec for TEF	As originally notified			0%	NA	NA	FY 2024	NA	NA	FY 2024					
							8,600	6,300	2,100	0	1,056	5,244	0	0	0	0	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	NA	NA	FY 2024	NA	NA	FY 2024					
WA	PM	SRS	Install HT-TCAP Feed/Product Transfer Lines	As originally notified			6,000	6,000	500	0	1,197	4,803	0	0	0	0	0	0
							0%	NA	NA	FY 2028	NA	NA	FY 2028					
WA	PM	SRS	Module Stripper Blower Redesign/Replacement	As originally notified			7,750	7,000	2,750	0	0	0	0	2,750	0	4,250	0	0
							0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	SRS	Glovebox Stripper Blower Redesign/Replacement	As originally notified			7,000	7,000	2,000	0	0	2,000	5,000	0	0	0	0	0
							0%	NA	NA	FY 2030	NA	NA	FY 2030					
WA	PM	SRS	Worker Protection System (WPS) Programmable Logic Controller (PLC) to Delta V Conversion	As originally notified			6,250	5,750	750	0	0	0	0	0	0	0	750	5,000
							0%	FY 2023	FY 2024	FY 2025	FY 2023	FY 2024	FY 2025					
WA	PM	SRS	Waste Container Handling Area	As originally notified			11,262	15,000	3,697	0	0	3,697	11,303	0	0	0	0	0
							0%	NA	NA	FY 2027	NA	NA	FY 2028					
WA	PM	SRS	Pu Metallography Capability	As originally notified			5,000	5,000	1,000	0	0	1,000	4,000	0	0	0	0	0
					✓		0%	NA	NA	FY 2029	NA	NA	FY 2029					
WA	PM	SRS	TEF Z-Bed Recovery Piping Replacement	Replace Z-Bed Recovery corroded Piping with hastalloy.			5,000	5,000	1,000	0	0	0	0	0	0	5,000	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2027	FY 2027	FY 2029	FY 2027	FY 2027	FY 2029					
WA	PM	SRS	Upgrade Existing STCS Components to Safety Class-Hydride Beds & Mix Tanks	Upgrade Existing STCS Components to Safety Class for Hydride Beds & Mix Tanks.			10,000	10,000	3,000	0	0	0	0	0	0	10,000	0	0
					✓		0%	FY 2026	FY 2026	FY 2031	FY 2026	FY 2026	FY 2031					
WA	PM	SRS	Automated Reservoir Management System (ARMS) 3	Upgrade existing ARMS 2 system due to Safety Class. Existing system will no longer be supported by vendor in FY 2029.			17,000	17,000	2,000	0	0	0	0	0	17,000	0	0	0
					✓	✓	0%	FY 2027	FY 2027	FY 2034	FY 2027	FY 2027	FY 2034					
WA	PM	SRS	TEF Classified D/3 DCS to Delta V DCS Conversion	This project replaces the Obsolete Distributed Control System (DCS) within the Tritium Extraction Facility (TEF) with Delta V technology.			26,000	26,000	5,000	0	0	0	0	0	0	26,000	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	NA	NA	FY 2026	NA	NA	FY 2027					
WA	PM	Y-12	Modularize Salvage Operations	This is a risk reduction modernization project aimed at burning down the production risk to material deliverables that Building 9204-2 presents to the Lithium Modernization Program. This project is skid system comprised of an entirely transportable "process system in a box" and can be easily hooked up to power and utilities with very little on-site construction required. The salvage equipment would be sized to support maximum production and recovery/ purification rates. This project will allow the program to continue to meet yearly salvage material requirements.			Below $5M	8,000	2,500	2,500	3,000	2,500	0	0	0	0	0	0
							0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9215 Liquid Transfer Station	As originally notified			7,000	7,000	300	0	300	6,700	0	0	0	0	0	0
							0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9204-2E Liquid Transfer Station	As originally notified			7,000	7,000	300	0	300	6,700	0	0	0	0	0	0
							0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9995 Liquid Transfer Station	As originally notified			7,000	7,000	300	0	300	6,700	0	0	0	0	0	0
							0%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	PM	Y-12	Drying Oven #3	As originally notified			5,200	5,200	-	0	0	5,200	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							4%	NA	NA	FY 2024	NA	NA	FY 2024					
WA	PM	Y-12	9212 Decon/Sorting and Segmenting Facility	As originally notified			9,600	7,958	-	2,508	3,491	1,959	0	0	0	0	0	0
							0%	FY 2023	FY 2023	FY 2026	FY 2026	FY 2026	FY 2027					
WA	PM	Y-12	LiM Lithium Lab Area Upgrades	As originally notified			14,000	16,000	-	0	0	16,000	0	0	0	0	0	0
							0%	FY 2023	FY 2023	FY 2026	FY 2025	FY 2025	FY 2026					
WA	PM	Y-12	LiM 9204-2 Redundant Crusher Grinder Installation	As originally notified			11,000	11,000	-	0	0	11,000	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	DUM 9215 Tower Water Execution	Increase 9215 Complex tower water supply to support multiple simultaneous operations.			5,000	5,000	2,000	0	0	0	5,000	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9215 Demo & Modification of High Bay Rack Area	Modify material handling area in Building 9215 for UPF interface.			7,500	7,500	-	0	0	0	7,500	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9995 Uranium Area Room 152	Perform room-specific renovations (including HVAC, electrical, gas) of labs in Area Room 152 allowing for installation of analytical instruments in the room.			7,900	7,900	-	0	0	0	7,900	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9995 Uranium Area Room 153	Perform room-specific renovations (including HVAC, electrical, gas) of labs in Area Room 153 allowing for installation of analytical instruments in the room.			9,300	9,300	-	0	0	0	9,300	0	0	0	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	9995 Uranium Area Room 154	Perform room-specific renovations (including HVAC, electrical, gas) of labs in Area Room 154 allowing for installation of analytical instruments in the room.			7,800	7,800	-	0	0	0	7,800	0	0	0	0	0
					✓		0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
WA	PM	Y-12	9995 Uranium Area Room 158	Perform room-specific renovations (including HVAC, electrical, gas) of labs in Area Room 158 allowing for installation of analytical instruments in the room.			15,800	15,800	1,500	0	0	0	1,500	14,300	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	UM Bldg 9204-2E Sample Capability Assoc Constr	Facility modifications affiliated with the install of new drill press equipment to obtain laboratory sample specimens for chemical analysis.			6,500	6,500	-	0	0	0	6,500	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
WA	PM	Y-12	Depleted and Binary Auxiliary Lab Assoc Construction	Renovation incl HVAC to accommodate new instrument lab in PA.			9,500	9,500	1,000	0	0	0	0	9,500	0	0	0	0
					✓		0%	FY 2025	FY 2025	FY 2027	FY 2025	FY 2025	FY 2027					
WA	PM	Y-12	Enriched Uranium Lab Replacement for 9995	Enriched uranium lab to perform sample analysis.			24,500	24,500	2,500	0	0	0	0	2,500	22,000	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2025	FY 2025	FY 2027	FY 2025	FY 2025	FY 2027					
WA	PM	Y-12	Enriched Uranium Vault for 9995	Enriched uranium vault that will store samples prior to analysis.			24,200	24,200	2,500	0	0	0	0	2,500	21,700	0	0	0
					✓		0%	FY 2025	FY 2025	FY 2027	FY 2025	FY 2025	FY 2027					
WA	PM	Y-12	Depleted Uranium Lab for 9995	Depleted uranium lab to perform sample analysis.			24,000	24,000	2,500	0	0	0	0	2,500	21,500	0	0	0
					✓		0%	FY 2025	FY 2025	FY 2027	FY 2025	FY 2025	FY 2027					
WA	PM	Y-12	DUM Rolling 9215 Stack 11 Replacement (formerly Stock 11 Replacement)	Replace exhaust stacks on building 9215.			15,000	15,000	2,000	0	0	0	0	2,000	13,000	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	PM	Y-12	Bldg. 9215 UCl3 Stand-Alone Reactor Assoc Constr	Installation of glovebox and related equipment includes anchorage of equipment, overhead grid steel structure, stainless steel floor covering, and electrical, mechanical, and HVAC modifications.			20,000	20,000	-	0	0	0	20,000	0	0	0	0	0
WA	**PM**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**78,318**	**155,576**	**129,571**	**74,562**	**155,080**	**87,432**	**61,043**	**NA**

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	I&O	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	22,163	43,998	2,000	10,198	0	0	0	NA
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	I&O	KCNSC	Building 23 North Surveillance Production Activities Expansion Buildout	Construct walls, drop ceilings, electrical utility grids, ESD flooring, HVAC, LN2, and other required utilities to support the installation of equipment and testers, adding approximately 20,000 sq. ft. of manufacturing space.			14,350	14,350	1,436	-	-	-	1,436	12,914	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	I&O	KCNSC	Building 23 North Additive Manufacturing Expansion Buildout	Construct walls, drop ceilings, electrical utility grids, ESD flooring, HVAC, humidity controls, specialty filtration, and other required utilities to support the installation of equipment to align to Building Code requirements for AM, adding approximately 15,000 sq. ft. of manufacturing space.			16,022	16,022	1,460	-	-	-	1,460	14,562	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	I&O	KCNSC	Building 23 North Non-Destructive Testing & Environmental Lab Buildout	Construct walls, containment areas, mechanical utilities, electrical utility grids, HVAC, and other required utilities adding approximately 20,000 sq. ft. to support the equipment installations for non-destructive lab and environmental testing.			15,959	15,959	1,310	-	-	-	1,310	14,649	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	I&O	KCNSC	Building 23 North Manufacturing Support Buildout	Project includes structural steel work, walls, electrical and mechanical utilities, HVAC, IT cabling, office furniture and other required utilities to support embedded factory manufacturing office personnel, a satellite badge office, HS&E for medical and personal protective equipment labs, adding approximately 30,000 square feet.			12,924	12,924	1,059	-	-	-	1,059	11,865	0	0	0	0
							83%	FY 2021	FY 2021	FY 2022	FY 2021	FY 2022	FY 2023					
WA	I&O	KCNSC	Building 23 Tool Room & Model Shop Machining Operations Area Expansion Buildout (formerly Building 23 Tool Room & Model Shop Machining Revitalization)	As originally notified			12,694	10,042	805	805	9,237	0	0	0	0	0	0	0
							71%	FY 2021	FY 2021	FY 2023	FY 2021	FY 2022	FY 2024					
WA	I&O	KCNSC	Building 23 W80-4 Manufacturing Development Area Buildout	As originally notified			14,700	18,242	1,470	1,723	16,519	0	0	0	0	0	0	0
							52%	FY 2022	FY 2022	FY 2023	FY 2022	FY 2023	FY 2024					
WA	I&O	KCNSC	Building 23 W87-1 Manufacturing Development Area Buildout	As originally notified			13,006	20,410	1,355	0	13,006	7,404	0	0	0	0	0	0

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WA	I&O	KCNSC	New Surface Parking Lot	Build an additional 500 space parking lot to address mission growth at KCNSC.			92%	NA	NA	FY 2022	FY2020	FY2021	FY 2023					
							Below $5M	5,287	375	462	4,825	0	0	0	0	0	0	0
WA	I&O	KCNSC	New Maintenance Operations Office Facility	Procure and install the office PODs (real property), and associated utility and IT services to enable functional maintenance operations, this project enables building 2 to be entirely classified space, adding approximately 6,000 sq. ft.			59%	NA	NA	FY 2023	FY2021	FY2021	FY 2023					
							Below $5M	6,376	375	5,786	590	0	0	0	0	0	0	0
WA	I&O	KCNSC	Building 23 North Classification Upgrade	Install security systems, dock door covers, entry vestibule at the existing entry and other security infrastructure to support securing the space.	✓		0%	FY 2023	FY 2024	FY 2026	FY 2023	FY 2024	FY 2026					
							6,935	6,935	696	0	0	6,935	0	0	0	0	0	0
WA	I&O	KCNSC	Building 23 Advanced and Exploratory Technologies Area Buildout	As originally notified			0	FY 2023	FY 2024	FY 2025	FY 2023	FY 2024	FY 2026					
							18,165	22,434	1,857	0	0	1,857	20,577	0	0	0	0	0
WA	I&O	KCNSC	Building 23 North Expansion Infrastructure Upgrades, KCNSC	As originally notified			0%	FY 2023	FY 2023	FY 2024	FY 2023	FY 2024	FY 2026					
							18,243	22,678	1,868	0	0	1,868	20,810	0	0	0	0	0

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								Original			Current							
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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							59%	FY 2021	FY 2021	FY 2023	FY 2021	FY 2022	FY 2024					
WA	I&O	LLNL	Building 321A Radiological & Material Characterization Capabilities Revitalization	As originally notified			11,500	17,185	1,500	1,985	15,200	0	0	0	0	0	0	0
							59%	NA	NA	FY 2024	FY 2022	FY 2022	FY 2024					
WA	I&O	LLNL	Building 132N Variable Air Control Replacement (previously Building 132N Defense Programs Research Variable Air Control Replacement)	As originally notified			6,500	6,500	325	0	6,500	0	0	0	0	0	0	0
							67%	FY 2022	FY 2022	FY 2024	FY 2022	FY 2023	FY 2024					
WA	I&O	LLNL	Site 300 - Zone 3 Water System Upgrades (previously Site 300 Water Supply Piping & Valve Zone 3 & Other Upgrades)	As originally notified			11,000	11,000	400	0	11,000	0	0	0	0	0	0	0
							50%	FY 2022	FY 2022	FY 2023	FY 2022	FY 2022	FY 2024					
WA	I&O	LLNL	New Experimental Science Office Facility Building 266 (STAR)	As originally notified			19,400	22,200	900	0	22,200	0	0	0	0	0	0	0

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							65%	FY 2021	FY 2021	FY 2023	FY 2021	FY 2022	FY 2024					
WA	I&O	LLNL	New Design & Certification Science Support Office Facility Building 449 (STAR) (previously New Building 266 Design & Certification Science Support Office Facility)	As originally notified			17,800	22,200	400	21,200	1,000	0	0	0	0	0	0	0
					✓		0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
WA	I&O	LLNL	Site 200 U791 and U792 Electrical Utility Substation Upgrade	Install a second 100MVA Main-Power Substation Transformer and transformer redundancy to maintain the electric utility system reliability and operating flexibility at a high level as the LLNL electrical load continues to grow to meet the DOE mission need.			22,850	22,850	1,325	0	0	0	1,325	21,525	0	0	0	0
			⌛		✓		0%	FY 2023	FY 2024	FY 2026	FY 2023	FY 2024	FY 2026					
WA	I&O	LLNL	Building 391 Optics and Materials Science Clean room Conversion	Upgrade room 1250 to a clean room, includes removal of existing HEPA filters, lighting, and ceiling system and removal of an existing office trailer. The finished space will be a Class 100 Cleanroom, which is required to meet the processing needs of the Optics and Materials Science and Technology Group.			19,000	19,000	1,400	-	-	5,000	14,000	0	0	0	0	0

($K)

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							Percent Complete	Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0	FY 2022	FY 2022	FY 2023	FY 2023	FY 2023	FY 2025					
WA	I&O	LFO	New Livermore Federal Center Office Building	As originally notified			19,300	24,250	1,000	0	0		24,250	0	0	0	0	0
							45%	FY 2023	FY 2023	FY 2025	FY 2022	FY 2023	FY 2024					
WA	I&O	LLNL	New LEP Warehouse Building 143 (previously New Site 200 Weapon Activity Warehouse)	As originally notified			13,950	13,950	825	0	13,950	0	0	0	0	0	0	0
							51%	FY 2022	FY 2022	FY 2024	FY 2021	FY 2022	FY 2024					
WA	I&O	LLNL	Building 654 Stockpile Science Computing Facility Expansion (previously B654 Expansion)	As originally notified			18,000	20,350	900	2,050	18,300	0	0	0	0	0	0	0
							15%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	I&O	LLNL	Building 190 CAMS SF6 Transfer Station Upgrade Bldg	As originally notified			5,800	5,800	425	0	0	5,800	0	0	0	0	0	0
							0%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	I&O	LLNL	Building 850 Upgrade	As originally notified			7,000	7,000	400	0	0	7,000	0	0	0	0	0	0
							0%	NA	NA	FY 2026	NA	NA	FY 2026					
WA	I&O	LLNL	Building 133 Heating Hot Water System Upgrade	As originally notified			7,950	7,950	650	0	0	7,950	0	0	0	0	0	0

($K)

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	FY 2023	FY 2024	FY 2025	FY 2023	FY 2024	FY 2026					
WA	I&O	LLNL	Site 200 Electrical Utility Re-distribution System Capacity Upgrade	As originally notified			15,025	15,025	245	0	0	15,025	0	0	0	0	0	0
							26%	FY 2022	FY 2023	FY 2025	FY 2022	FY 2023	FY 2025					
WA	I&O	LLNL	Building 331 Tritium Delivery System Upgrade	As originally notified			19,450	19,450	1,650	0	19,450	0	0	0	0	0	0	0
							16%	FY 2023	FY 2024	FY 2025	FY 2023	FY 2023	FY 2025					
WA	I&O	LLNL	Building 151 Nuclear and Radiochemistry Facility Dissolver Laboratory Suite Upgrade	As originally notified			12,400	12,400	585	0	0	12,400	0	0	0	0	0	0
							0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
WA	I&O	LLNL	U193 Site 200 Sewer Diversion Plant Facility Upgrade	As originally notified			16,375	16,375	1,200	0	0	1,200	15,175	0	0	0	0	0

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								Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
WA	I&O	LLNL	U291 Cooling Tower Upgrade	Replace the three crossflow cooling towers including cooling fans, gearboxes, motors and controls. Will also install an additional cooling tower complete with lift pumps, heat exchangers and associated electrical switchgear and controls will be installed.			24,000	24,000	1,350	0	0	0	1,350	22,650	0	0	0	0
							82%	NA	NA	FY 2023	FY 2017	FY 2019	FY 2023					
WA	I&O	LAFO	East Jemez Rd./NM State Rd. 4 Intersection Reconfiguration	Project is part of the Supplemental Environmental Project (SEP) contained in the Administrative Order from the New Mexico Environmental Department (NMED) resulting from the WIPP incident in 2014. This project will upgrade the existing intersection by adding additional turning lanes, improve existing turning lanes and upgrade traffic signals and related infrastructure at the intersection.			Below $5M	9,075	575	6,551	2,524	0	0	0	0	0	0	0
							15%	FY 2022	FY 2023	FY 2023	FY 2021	FY 2022	FY 2025					
WA	I&O	LANL	New TA-15 DARHT Hydro Vessel Repair Facility	As originally notified			16,491	16,491	2,800	2,800	13,691	0	0	0	0	0	0	0

($K)

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								Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							48%	FY 2022	FY 2022	FY 2023	FY2022	FY2023	FY2024					
WA	I&O	LANL	TA-55 Fire Suppression Water Line for Program Facilities	As originally notified			13,895	13,894	579	-	13,894	0	0	0	0	0	0	0
							11%	FY 2022	FY 2022	FY 2023	FY2022	FY2023	FY2024					
WA	I&O	LANL	New TA-22 Detonator Storage Magazines	As originally notified			11,137	11,137	1,437	0	1,437	9,700	0	0	0	0	0	0
							0%	NA	NA	FY2026	FY2023	FY2024	FY2026					
WA	I&O	LANL	TA-55 Fire Suppression Water Line for Security Facilities	As originally notified			9,472	9,472	965	0	0	965	8,507	0	0	0	0	0
							0%	FY 2023	FY 2023	FY 2025	FY 2023	FY 2024	FY 2025					
WA	I&O	LANL	New TA-63 Fire Station 1 (STAR)	As originally notified			22,500	22,500	995	0	0	22,500	0	0	0	0	0	0
							63%	FY 2021	FY 2021	FY 2023	FY 2021	FY 2023	FY 2024					
WA	I&O	LANL	New TA-16 Fire Station 5 (SPEAR)	As originally notified			18,600	21,200	1,900	19,600	1,600	0	0	0	0	0	0	0
							3%	FY 2022	FY 2023	FY 2025	FY 2022	FY 2024	FY 2025					
WA	I&O	LANL	New TA-03 Weapons Archive Records Facility (WARF)	As originally notified			16,600	16,600	1,800	0	16,600	0	0	0	0	0	0	0
					✓		0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
WA	I&O	LANL	SM-39 Window Replacements	Replace approximately 100 window sections to address ongoing safety concerns and improve efficiency, while also meeting historical requirements.			11,620	11,620	1,550	0	0	0	1,500	10,120	0	0	0	0

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								Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							50%	FY 2020	FY 2020	FY 2022	FY 2022	FY2023	FY2024					
WA	I&O	NNSS	Mercury Mission Technical Support Facility (Formerly Mercury 23-462 Building 3)	As originally notified			13,800	16,500	950	0	16,500	0	0	0	0	0	0	0
							50%	NA	NA	FY2024	FY2022	FY2023	FY2024					
WA	I&O	NNSS	New DAF Operations Complex Site Preparations	As originally notified			6,500	8,000	800	0	8,000	0	0	0	0	0	0	0
							13%	NA	NA	FY2025	FY2022	FY2023	FY2025					
WA	I&O	NNSS	New DAF Operations Complex Utilities	As originally notified			7,500	9,700	900	0	900	8,800	0	0	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
WA	I&O	NNSS	DAF New Operations Support Facility Bldg. 06-540 (STAR)	This project provides the first new support building at the DAF Complex, including development and construction of new, modern, energy efficient 14,000 square foot facility to accommodate the increased Operations and Maintenance personnel needed to support a growing set of missions at the DAF.			23,500	23,500	2,350	0	0	0	0	23,500	0	0	0	0
							44%	NA	NA	FY2024	FY2022	FY2023	FY2024					
WA	I&O	NNSS	Area 6 CP Hill to Fire Station Junction Water Line Upgrade	As originally notified			5,500	5,500	500	0	5,500	0	0	0	0	0	0	0

								($K) Original			Current							
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WA	I&O	NNSS	U1a Underground Power Distribution Upgrade	As originally notified			26%	FY 2022	FY 2022	FY 2025	FY2022	FY2024	FY2026					
							13,000	13,000	1,500	0	1,500	-	11,500	0	0	0	0	0
WA	I&O	NNSS	New U1a Operations Support Facility 01-380 (STAR) (previously New U1a Operations Support Facility 01-351 (STAR))	As originally notified			10%	FY 2021	FY 2022	FY 2024	FY2022	FY2023	FY2026					
							19,500	19,900	1,000	1,400	0	0	18,500	0	0	0	0	0
WA	I&O	NNSS	Tweezer Substation Upgrade	As originally notified			39%	FY 2022	FY 2022	FY 2024	FY 2022	FY 2024	FY 2025					
							11,000	11,000	1,500	0	11,000	0	0	0	0	0	0	0
WA	I&O	NNSS	New U1a Centralized Monitor and Control Center	As originally notified			0%	FY 2023	FY 2024	FY 2025	FY 2024	FY 2025	FY 2026					
							12,000	12,000	1,700	0	0	0	1,700	10,300	0	0	0	0
WA	I&O	NNSS	New U1a 02b Refuge Station	As originally notified			0%	FY 2024	FY 2025	FY 2028	FY 2023	FY 2024	FY 2027					
							16,700	16,700	2,000	0	0	2,000	14,700	0	0	0	0	0
WA	I&O	NNSS	New Area 23 Mercury Solar PV & Storage Installation (ERICA)	This project is expected to achieve between 3 to 5 MW of PV with an optimized amount of battery storage.	✓		0%	FY 2024	FY 2025	FY 2027	FY 2024	FY 2025	FY 2027					
							23,800	23,800	3,600	0	0	0	3,600	20,200	0	0	0	0
WA	I&O	PX	Southeast Circuit Upgrade	As originally notified			47%	NA	NA	FY 2024	FY 2022	FY 2023	FY 2024					
							-	7,625	-	0	7,625	0	0	0	0	0	0	0

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Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Original Project Start	Original Design Complete	Original Constr. Complete	Current Project Start	Current Design Complete	Current Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	NA	NA	FY 2026	FY 2023	FY 2024	FY 2026					
WA	I&O	PX	Building 15-34 Pump House and Tank Upgrades	As originally notified			-	6,350	-	0	0	6,350	0	0	0	0	0	0
					✓		0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
WA	I&O	PX	South Main Substation Switchgear, Capacitor Bank, & Controller Upgrade - 100 Circuit	Replace the switchgear, capacitor banks, and controllers on 100 circuit at the South Main Substation.			12,625	12,625	1,900	-		-	1,900	10,725	0	0	0	0
							96%	FY 2019	FY 2020	FY 2022	FY 2019	FY 2020	FY 2023					
WA	I&O	SRS	234-7H Exhaust Ventilation System Installation Portfolio (previously 234-7H New Utility Support Building and Exhaust Ventilation System Installation)	As originally notified			11,900	20,936	1,700	11,923	9,013		0	0	0	0	0	0
							0%	FY 2022	FY 2022	FY 2024	FY2023	FY2024	FY2026					
WA	I&O	SRFO	New Tritium Office Building (STAR)	As originally notified			19,600	17,850	1,750	0		17,850	0	0	0	0	0	0
							30%	FY 2022	FY 2022	FY 2024	FY 2022	FY 2023	FY 2025					
WA	I&O	SNL	Substation 36 Upgrade	As originally notified			10,000	10,000	1,000	0	10,000	0	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							58%	NA	NA	FY 2024	FY 2021	FY 2022	FY 2024					
WA	I&O	SNL	Building 6715 Light Initiated High Explosive (LIHE) Test Facility Upgrades	As originally notified			7,000	23,410	750	9,250	3,300	10,860	0	0	0	0	0	0
							68%	FY 2021	FY 2022	FY 2023	FY 2021	FY 2023	FY 2024					
WA	I&O	SNL	TA-I Substation 35 Upgrade (previously TA-I Substation 35 Replacement)	As originally notified			10,000	10,000	1,000	3,500	6,500	0	0	0	0	0	0	0
							11%	FY 2023	FY 2023	FY 2025	FY 2023	FY 2024	FY 2025					
WA	I&O	SNL	NM New TA-II Master Substation	As originally notified			18,500	18,500	1,850	0	0	1,850	16,650	0	0	0	0	0
							9%	NA	NA	FY 2026	FY 2023	FY 2024	FY 2026					
WA	I&O	SNL	SNL\CA Site High Voltage LGS Replacement	As originally notified			5,700	5,700	600	0	0	5,700	0	0	0	0	0	0
							11%	NA	NA	FY 2025	FY 2023	FY 2023	FY 2025					
WA	I&O	SNL	Building 6530 High Radiation Laboratory Upgrade (AKA LINAC in TA-III)	As originally notified			5,400	5,400	400	0	0	5,400	0	0	0	0	0	0
							0%	FY 2023	FY 2024	FY 2025	FY 2023	FY 2024	FY 2026					
WA	I&O	SNL	TA-III, V, & Remotes 5kV Substation Replacement	As originally notified			19,500	19,500	1,950	0	0	1,950	17,550	0	0	0	0	0
							68%	FY 2020	FY 2021	FY 2022	FY 2021	FY 2022	FY 2024					
WA	I&O	SNL	High-G Surveillance Testing Capability Addition (WETL/Pantex)	As originally notified			18,000	17,667	1,700	3,417	14,250	0	0	0	0	0	0	0

								($K) Original			Current							
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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
WA	I&O	SNL	TA-IV District Chilled Water Expansion	As originally notified			64%	FY 2021	FY 2022	FY 2023	FY 2021	FY 2022	FY 2024					
							18,250	14,650	1,500	1,550	13,100	-	0	0	0	0	0	0
WA	I&O	SNL	New Stockpile and Component Modernization Support Building (STAR)	As originally notified			0%	FY 2023	FY 2022	FY 2024	FY 2022	FY 2023	FY 2025					
							16,400	16,500	1,500	1,500	0	0	15,000	0	0	0	0	0
WA	I&O	SNL	CA Electrical Substation 41, 42, 43 & 44 Upgrades	Upgrade end-of-life substations 41, 42 & 43 to the current accepted standard. Upgrades include replacement of the load interrupter, transformers, low voltage distribution section, distribution breakers, monitoring, and metering equipment.	✓		0%	NA	NA	FY 2026	FY 2024	FY 2025	FY 2026					
							7,900	7,900	400	0	0	-	400	7,500	0	0	0	0
WA	I&O	SNL	Weapons Evaluation and Testing Laboratory Addition - Lab & Office Space (WETL/PX)	Construct addition to existing building, adding 4,000 sq. ft. for laboratory and office spaces with all required infrastructure to support new legacy and W80-4 test capability needs.	✓		0%	FY 2024	FY 2025	FY 2027	FY 2024	FY 2025	FY 2027					
							14,500	14,500	1,500	0	0	0	1,500	13,000	0	0	0	0
WA	I&O	SNL	New C964 Microgrid (ERICA)	Project will install a local microgrid will for Building 964. The microgrid will consist of new DC Photovoltaic arrays, battery energy storage systems (BESS), and energy control center.	✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
							17,500	17,500	1,000	0	0	0	1,000	16,500	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
WA	I&O	Y-12	Development Facility Conversion (formerly Production Development Facility Acquisition and Revitalization Modification)	As originally notified			0%	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025					
							16,000	24,000	1,500	12,794	11,206		0	0	0	0	0	0
WA	I&O	Y-12	Building 9201-05N AJ-5714 HVAC Replacement	As originally notified			33%	NA	NA	FY 2024	FY 2022	FY 2023	FY 2024					
							5,413	6,330	286	0	6,330	0	0	0	0	0	0	0
WA	I&O	Y-12	New West End Production Change House	As originally notified			0%	FY 2022	FY 2022	FY 2024	FY 2025	FY 2026	FY 2028					
							13,824	17,500	1,284	-	-	-	-	17,500	0	0	0	0
WA	I&O	Y-12	Building 9995 198/222 Feeders Electrical Panel Replacement	As originally notified			41%	NA	NA	FY 2024	FY 2022	FY 2023	FY 2024					
							5,400	5,529	1,155	0	1,155	0	4,374	0	0	0	0	0
WA	I&O	Y-12	Building 9720-32 Facility Conversion	Modify building 9720-32 to support real-time radiography and sort and segregation activities. The modifications include electrical upgrades, negative pressure enclosure installation, boundary control station installation, fire protection system modifications, and office area modifications.	✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
							14,445	14,455	2,100	0	0	0	2,100	12,355	0	0	0	0
WA	**I&O**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**349,565**	**210,362**	**225,233**	**250,063**	**-**	**-**	**-**	**NA**

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	STA	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	1,591	1,623	13,053	11,336	8,449	5,720	12,550	NA
							0%	NA	NA	FY2023	NA	NA	FY 2024					
WA	STA	AR	Training Command Physical Training Facility	Design and build (renovation, modernization, and expansion) of existing Building 1779, Physical Training Facility.			3,947	5,787	-	0	0	0	5,787	0	0	0	0	0
					✓		0%	FY 2025	FY 2025	FY 2025	FY 2025	FY 2025	FY 2025					
WA	STA	AR	TRACOM (Training Command) Construct Multi-Use Facility	This project will centralize training functions and consolidate staff from (7) WWII era wood structures into one modern energy efficient facility.			14,182	14,182	1,418	0	0	0	0	14,182	0	0	0	0
					✓		0%	NA	NA	FY 2027	NA	NA	FY 2027					
WA	STA	AR	Training Command Drive Track/Skid Pad	Construct Training Command Drive Track/Skid Pad			7,277	7,277	-	0	0	0	0	0	7,277	0	0	0
							0%	FY 2021	FY 2022	FY 2023	FY 2022	FY 2022	FY 2023					
WA	STA	NM	Vehicle Maintenance Facility – Agent Operation Western Command (AOWC) VMF	As originally notified			12,000	23,989	1,200	0	23,989	0	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	NA	NA	FY 2027	NA	NA	FY 2027					
WA	STA	NM	Agent Operations Western Command- Military Operations in Urban Terrain Site	Construct - Military Operations in Urban Terrain site at Western Command Tactical Training Area			8,248	8,248	-	0	0	0	0	0	8,248	0	0	0
					✓		0%	FY 2027	FY 2027	FY 2028	FY 2027	FY 2027	FY 2028					
WA	STA	NM	Agent Operations Western Command Indoor Firing Range	Construct Agent Operations Western Command Indoor Firing Range			15,503	15,503	-	0	0	0	0	0	0	15,503	0	0
							0%	FY 2023	FY 2023	FY 2024	FY 2023	FY 2023	FY 2024					
WA	STA	TN	Agent Operations Central Command Sitewide Infrastructure Upgrades	As originally notified			5,000	11,000	-	0	3,900	7,100	0	0	0	0	0	0
							0%	FY 2022	FY 2023	FY 2024	FY 2024	FY 2024	FY 2025					
WA	STA	TX	Vehicle Maintenance Facility – Agent Operations Central Command VMF	As originally notified			15,000	25,000	1,500	0	0	25,000	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2026	FY 2026	FY 2027	FY 2026	FY 2026	FY 2027					
WA	STA	TN	Agent Operations Central Command Federal Agent Facility	The project will design and build a new Central Command agent facility. Functional spaces will include administrative offices, weapons armory, supply and weapons issue, gun cleaning, agent ready room, agent common areas for computer access, and IT.			15,300	15,300	1,530	0	0	0	0	0	15,300	0	0	0
					✓		0%	FY 2028	FY 2028	FY 2029	FY 2028	FY 2028	FY 2029					
WA	STA	TN	Agent Operations Central Command Indoor Firing Range	Construct Agent Operations Central Command Indoor Firing Range			17,000	17,000	-	0	0	0	0	0	0	0	17,000	0
WA	**STA**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**29,480**	**33,723**	**18,840**	**25,518**	**39,274**	**21,223**	**29,550**	**NA**
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
WA	DNS	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	1,479	1,587	1,696	1,775	1,812	1,851	1,889	NA
					✓		0%	NA	NA	FY 2028	NA	NA	FY 2028					
WA	DNS	NNSS	Device Assembly Facility (DAF) Vehicle Barrier	Install a robust Vehicle Barrier System to replace the current cable barrier that is on the security fence with a new standalone barrier on the secure side of the PIDAS.			8,700	8,700	300	0	0	0	300	0	8,400	0	0	0
							0%	FY 2020	FY 2020	FY 2024	FY 2020	FY 2020	FY 2027					
WA	DNS	PX	Zone 12 PIDAS Vehicle Barriers	As originally notified			11,250	10,850	250	250	0	10,600	0	0	0	0	0	0

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								Original			Current							
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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	NA	NA	FY 2027	NA	NA	FY 2032					
WA	DNS	PX	Pantex Zone 4 PIDAS Vehicle Barriers	As originally notified			9,300	11,780	430	250	0	0	0	0	0	0	11,530	0
							20%	NA	NA	FY 2023	NA	NA	FY 2025					
WA	DNS	Y-12	Y12 PIDAS Vehicle Barriers	As originally notified			9,300	9,160	430	4,750	4,410	0	0	0	0	0	0	0
WA	**DNS**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**5,889**	**12,187**	**1,996**	**1,775**	**10,212**	**1,851**	**13,419**	**NA**
WA				**WA Total**			**NA**	**NA**	**NA**	**NA**	**589,955**	**530,601**	**569,274**	**491,675**	**318,078**	**196,792**	**192,111**	**NA**
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
DNN	MMM	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	0	0	0	0	0	0	0	NA
					✓		0%	FY 2024	FY 2025	FY 2027	FY 2024	FY 2025	FY 2027					
DNN	MMM	SRS	Commodity Center	Facility to store and manage commodities in support of the Surplus Plutonium Disposition program.			18,000	18,000	800	0	0	0	18,000	0	0	0	0	0
							71%	FY 2020	FY 2020	FY 2021	FY 2019	FY 2023	FY 2023					
DNN	MMM	SRS	Mobile Melt-Consolidate System	As originally notified			10,663	14,854	1,336	11,245	3,609	0	0	0	0	0	0	0
							0%	FY 2023	FY 2023	FY 2024	FY 2024	FY 2024	FY 2025					
DNN	MMM	SRS	Mobile Melt-Consolidate System 2.0	As originally notified			11,000	12,500	2,000	0	0	12,500	0	0	0	0	0	0
					✓		0%	FY 2024	FY 2025	FY 2026	FY 2024	FY 2025	FY 2026					
DNN	MMM	SRS	Install CCO Storage Racks	Installation of horizontal storage racks to increase Criticality Control Overpack (CCO) package storage capacity and allow for automated CCO mining.			10,000	10,000	1,500	0	0	0	10,000	0	0	0	0	0
DNN	**MMM**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**3,609**	**12,500**	**28,000**	**-**	**-**	**-**	**-**	**NA**

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
DNN	GMS	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	5,265	5,649	6,039	6,319	6,452	6,588	6,726	NA
							0%	FY 2020	FY 2021	FY 2022	FY 2020	FY 2023	FY 2024					
DNN	GMS	Y-12	Enhanced Training Center (ETC)	As originally notified			18,000	25,000	1,500	18,000	7,000	0	0	0	0	0	0	0
DNN	**GMS**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**12,265**	**5,649**	**6,039**	**6,319**	**6,452**	**6,588**	**6,726**	**NA**
					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
DNN	R&D	NA	MC (TEC <$5M)	N/A			N/A	N/A	N/A	N/A	474	509	544	569	581	593	606	N/A
							70%	FY 2021	FY 2023	FY 2026	NA	NA	FY 2026					
DNN	R&D	ORNL	Uranium Science and Technology Center	As originally notified			23,902	23,902	750	4,900	0	19,002	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
DNN	R&D	PNNL	325RPL (Radiochemical Processing Laboratory) Inorganic Synthesis Laboratory Upgrade	Establish a new research and development space by joining several offices and laboratories into a single science and technology environment.			9,400	9,400	900	0	0	0	0	9,400	0	0	0	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
DNN	R&D	PNNL	325 RPL (Radiochemical Processing Laboratory) Analytical and On-Line Monitoring Laboratory Upgrade	Co-locate laboratory processes to improve equipment distribution, system development, and streamline on-line process monitoring. New gloveboxes and fume hoods will be installed to support actinide fundamental science research and actinide analytical capabilities.			9,200	9,200	700	0	0	0	0	700	8,500	0	0	0

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								Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2023	FY 2023	FY 2025	FY 2023	FY 2023	FY 2025					
DNN	R&D	PNNL	325RPL (Radiochemical Processing Laboratory) Hot Cell Renovation	Increase hot cell capacity/capabilities to process high-radiation materials, including acceptance of a full-length fuel rod and ability to manage Waste Isolation Pilot Plant certified containers. Additional work includes hot cell capacity (i.e., modular hot cell), and vertical loadout capabilities.			23,100	23,100	2,000	0	0	0	0	0	0	2,000	21,100	0
DNN	**R&D**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**474**	**19,511**	**544**	**10,669**	**9,081**	**2,593**	**21,706**	**NA**
					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
DNN	NCTIR	NA	MC (TEC <$5M)	N/A			N/A	N/A	N/A	N/A	0	0	0	0	0	0	0	N/A
					✓		0%	FY 2023	FY 2024	FY 2025	FY 2023	FY 2024	FY 2025					
DNN	NCTIR	HQ	Emergency Operations Center Redesign (CEOC)	To repurpose approximately 6,000 sq feet of existing Vault Type Room or lower level space into Sensitive Compartmented Information Facility (SCIF) accredited operating space. Along with secure space, the area will include various information technology and communications systems co-located within one location.			12,524	12,524	751	0	0	4,751	7,773	0	0	0	0	0

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					✓		0%	NA	NA	FY 2024	NA	NA	FY 2024					
DNN	NCTIR	LLNL	Clean Lab	Purchase a prefabricated “turnkey” laboratory and install the modular unit adjacent to B154 at LLNL S200. Scope to include building site preparation and extension of underground electrical and mechanical utilities to the build site.			6,000	6,000	90	0	0	6,000	0	0	0	0	0	0
					✓		0%	NA	NA	FY 2024	NA	NA	FY 2024					
DNN	NCTIR	PNNL	Forensic Lab Upgrades	Increase available radiological space suitable for post-detonation forensic support by moving existing lab occupants to suitable space. Demolish three obsolete labs in Building 331 and install new floors, walls ceilings, fume hoods and casework.			5,000	5,000	300	0	0	300	4,700	0	0	0	0	0
DNN	**NCTIR**			**SUBTOTAL**			**NA**	**NA**	**NA**	**NA**	**-**	**11,051**	**12,473**	**-**	**-**	**-**	**-**	**NA**
DNN				**DNN Total**			**NA**	**NA**	**NA**	**NA**	**16,348**	**48,711**	**47,056**	**16,988**	**15,533**	**9,181**	**28,431**	**NA**
					NA	NA	NA	NA	NA	NA	NA	NA	NA					
NR	NR	NA	MC (TEC <$5M)	NA			NA	NA	NA	NA	3,549	4,761	2,811	34,786	37,318	61,630	61,210	NA
							40%	NA	NA	FY 2025	NA	NA	FY 2025					
NR	NR	BL	BL AMTL Upgrade EMTF Infrastructure	As originally notified			7,900	7,900	1,060	3,580	560	3,760	0	0	0	0	0	0
							70%	FY 2022	FY 2023	FY 2024	FY 2022	FY 2023	FY 2024					
NR	NR	BL	BL A7 Office Building	As originally notified			19,000	19,000	-	0	19,000	0	0	0	0	0	0	0

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							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
NR	NR	BL	BL Firehouse	The Firehouse project provides garage, storage, and training space for the Emergency Services organizations			100%	NA	NA	FY 2022	NA	NA	FY 2023					
							Below $5M	5,195	-	4,800	395	0	0	0	0	0	0	0
NR	NR	BL	BL Simulation Development Laboratory and BRES	As originally notified			0%	FY 2023	FY 2023	FY 2026	FY 2023	FY 2023	FY 2026					
							19,000	19,000	NA	0	0	19,000	0	0	0	0	0	0
NR	NR	BL	BL Warehouse Upgrade	As originally notified			10.0%	NA	NA	FY 2025	NA	NA	FY 2025					
							8,079	10,880	480	0	0	10,880	0	0	0	0	0	0
NR	NR	BL	BL Shock and Vibration Test Facility (SVTF) and Fundamental Shock and Vibration Test Laboratory (FSVTL)	This project recapitalizes testing capabilities necessary to support and develop current and future nuclear propulsion plants.	✓		0%	FY 2024	FY 2026	FY 2028	FY 2024	FY 2026	FY 2028					
							17,096	17,096	-	0	0	0	17,096	0	0	0	0	0
NR	NR	BL	BL Outfall 001 Detention Basin	This project constructs a detention basin, a water management best practice, for Outfall 001 to comply with revised state environmental requirements.	✓		0%	NA	NA	FY 2026	NA	NA	FY 2026					
							7,800	7,800	1,300	0	0	0	1,300	6,500	0	0	0	0
NR	NR	KL	KL Data Center Power and Capacity Upgrades	As originally notified			30%	FY 2022	FY 2023	FY 2024	FY 2021	FY 2023	FY 2026					
							12,911	12,911	1,259	0	1,259	11,652	0	0	0	0	0	0

($K)

Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete / Original TEC	Original: Project Start / Current TEC	Original: Design Complete / Constr. Design	Original: Constr. Complete / Prior Years	Current: Project Start / FY 2022 Enacted	Current: Design Complete / FY 2023 Enacted	Current: Constr. Complete / FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
							0%	NA	NA	FY 2026	NA	NA	FY 2026					
NR	NR	KL	KL 002 Outfall	As originally notified			7,600	8,828	800	0	0	800	0	8,028	0	0	0	0
							10.0%	FY 2022	FY 2023	FY 2028	FY 2022	FY 2023	FY 2029					
NR	NR	KL	KL Radio Upgrade	As originally notified			17,800	17,800	1,000	0	1,000	0	16,800	0	0	0	0	0
							0%	FY 2020	FY 2023	FY 2024	FY 2020	FY 2025	FY 2027					
NR	NR	KL	KL RML HVAC Upgrade	As originally notified			18,230	11,700	945	945	0	0	0	0	10,755	0	0	0
							0%	NA	NA	FY 2028	NA	NA	FY 2028					
NR	NR	KL	KL RML Building Envelope	As originally notified			6,939	7,210	630	0	0	630	0	0	6,580	0	0	0
							20.0%	NA	NA	FY 2025	NA	NA	FY 2025					
NR	NR	KS	KS CAS Relocation	As originally notified			6,100	6,100	300	745	0	0	0	5,355	0	0	0	0
							50.0%	NA	NA	NA	FY 2020	FY 2022	FY 2026					
NR	NR	KS	KS High Yard 30 Upgrade	As originally notified			8,269	11,460	623	623	10,837	0	0	0	0	0	0	0
							0%	NA	NA	FY 2025	NA	NA	FY 2025					
NR	NR	KS	KS East Gate Access	This project establishes a dedicated access road and security gate entrance for DOE-EM to execute demolition in the SE Quadrant.			Under $5M	6,273	300	3,100	0	0	3,173	0	0	0	0	0
							0.0%	FY 2023	FY 2025	FY 2029	FY 2023	FY 2025	FY 2029					
NR	NR	KS	KS Radio Upgrade	As originally notified			17,678	18,790	1,603	0	0	1,603	0	0	17,187	0	0	0
							0.0%	NA	NA	FY 2026	NA	NA	FY 2026					
NR	NR	NRF	NRF Transporter Path	As originally notified			6,745	6,745	479	0	0	479	0	6,266	0	0	0	0
							0.0%	FY 2023	FY 2024	FY 2028	FY 2023	FY 2025	FY 2028					
NR	NR	NRF	NRF ECF Electric Heat Conversion	As originally notified			13,500	13,500	1,000	0	0	1,000	0	0	12,500	0	0	0

($K)

Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Original Project Start	Original Design Complete	Original Constr. Complete	Current Project Start	Current Design Complete	Current Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0.0%	NA	NA	FY 2028	NA	NA	FY 2028					
NR	NR	NRF	NRF Utility Expansion Northeast	This project provides new utility mains (e.g., water, electric, sewer, etc.) to support existing and planned facilities in the northeast quadrant of the site.			6,100	6,100	400	0	0	0	400	0	5,700	0	0	0
					✓		0%	FY 2024	FY 2026	FY 2030	FY 2024	FY 2026	FY 2030					
NR	NR	NRF	NRF Integrated Electric Heat Conversion	This project modifies multiple facilities to convert steam to electric heating.			13,500	13,500	1,000	0	0	0	1,000	0	0	12,500	0	0
NR	**NR**			**NR Total**			**NA**	**NA**	**NA**	**NA**	**36,600**	**54,565**	**42,580**	**60,935**	**90,040**	**74,130**	**61,210**	**NA**
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
Inst	Inst	LANL	Pecos & Pajarito Roads Pedestrian Overpass (TA-50)	This project includes design and installation of a new pedestrian overpass at the intersection of Pecos and Pajarito Roads benefitting pedestrian and vehicle safety. The area has moderate to high pedestrian activity with some bicycle users.			8,750	8,750	750	0	0	0	750	8,000	-	-	-	0
					✓		0%	NA	NA	FY 2025	NA	NA	FY 2025					
Inst	Inst	LANL	TA-48 East Utilities and Road Installation	This project will design and install the necessary utilities infrastructure in the eastern section of TA-48 to support near term and future development. Work scope includes installation of potable/fire water line, electrical overhead service, natural gas, telecommunications duct bank install, secondary electrical power, extend sanitary sewer pipe, 780 ft. roadway including curb and gutter.			6,130	6,130	750	0	0	0	750	5,380	0	0	0	0

								($K) Original			Current						
Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Project Start	Design Complete	Constr. Complete	Project Start	Design Complete	Constr. Complete				
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
Inst	Inst	LANL	TA-33-0401 Secure Laboratory & Office Building	Construct a new 10,000 sq. ft. one-story laboratory and office facility to provide a facility that creates a series of physically and acoustically isolated spaces that support multiple, independent research projects with changing needs.			23,500	23,500	1,500	0	0	0	1,500	22,000	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
Inst	Inst	LANL	TA-48 Office Building (STAR)	This project will construct a new 22,000 sq. ft. two-story office facility to provide office and meeting space for multiple staff and programs within TA-48. The construction method will be modular construction. The project plans to provide 100 office spaces, accommodates 120 tenants.			23,500	23,500	1,500	0	0	0	1,500	22,000	0	0	0	0
					✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
Inst	Inst	LLNL	New Mission Support Replacement Office Building 171 (STAR)	Construct an approximately 20,000 SF office building to allow for migration out of substandard space and to create quality new office space for growing mission.			24,000	24,000	2,160	0	0	0	2,160	21,840	0	0	0	0

($K)

Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete / Original TEC	Original: Project Start / Current TEC	Original: Design Complete / Constr. Design	Original: Constr. Complete / Prior Years	Current: Project Start / FY 2022 Enacted	Current: Design Complete / FY 2023 Enacted	Current: Constr. Complete / FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Inst	Inst	LLNL	New Employee Center	Construct new ~20,000 gsf employee meeting space and fitness and enrichment activities facility in a central location to the LLNL population.	✓	N/A	0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
							23,000	23,000	2,760				2,760	20,240				
Inst	Inst	NNSS	Area 6 Shaker Plant Installation	Integrated Shaker Plant for processing aggregate material that will include wet and dry processing for onsite construction.	✓		0%	NA	NA	FY2024	NA	NA	FY2024					
							5,600	5,600	380	0	0	380	5,220	0	0	0	0	0
Inst	Inst	PX	JCDC Overhead tie to North Main Substation	This set-up allows PREP Windfarm power to supply the JCDC. This will provide second electrical feed from the North Main Substation (NMS) to the JCDC.	✓	N/A	0%	NA	NA	FY 2025	NA	NA	FY 2025					
							7,200	7,200	500	0	0	0	6,700					
Inst	Inst	PX	New Environmental Sampling/ IH Facility	Design and build a new 10,000 SF Environmental Sampling/ IH Lab Facility onsite. The building will be a metal frame and metal siding. Life expectancy of the building is 45 years.	✓		0%	FY 2024	FY 2024	FY 2025	FY 2024	FY 2024	FY 2025					
							16,600	16,600	1,000	0	0	0	1,000	15,600	-	0	0	0
Inst	Inst	SNL	SNL NM - EST Power and Communications to Ranges at 9920	This project is to install permanent power and communications infrastructure to provide safe and reliable services to the testing locations at the 9920 Complex.	✓		0%	NA	NA	FY2024	NA	NA	FY2024					
							5,760	5,760	250	0	0	250	5,510	0	0	0	0	0

($K)

Appr	Program	Site	Project Title	Project Description	New Notif.	Auth. - Con. Design	Percent Complete	Original: Project Start	Original: Design Complete	Original: Constr. Complete	Current: Project Start	Current: Design Complete	Current: Constr. Complete					
							Original TEC	Current TEC	Constr. Design	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
					✓		0%	FY 2024	FY 2024	FY 2026	FY 2024	FY 2024	FY 2026					
Inst	Inst	SNL	SNL NM - New Thunder Range EST Site Office	The project will replace aging office trailers with a new facility to provide adequate office space, additional space for team growth to support increased workload, and provide onsite classified workspace to support explosive testing operations at the Thunder Range.			13,000	13,000	250	0	0	0	250	12,750	0	0	0	0
Inst	**Inst**			**Inst. TOTAL**			**NA**	**NA**	**NA**	**NA**	**-**	**630**	**28,100**	**127,810**	**-**	**-**	**-**	**NA**

Abbreviations:

*State Abbreviations are standard UPSP codes
BL – Bettis Atomic Power Laboratory
DNN – Defense Nuclear Nonproliferation
DNS – Defense Nuclear Security
I&O - Infrastructure and Operations
Inst – Indirect funded Institutional (not an appropriation)
IT/Cyber - Information Technology and Cybersecurity
GMS - Global Material Security
HQ – DOE Headquarters
KCNSC – Kansas City National Security Campus
KL – Kenneth A. Kesselring Site, Naval Nuclear Laboratory
LAFO – Los Alamos Field Office
LANL – Los Alamos National Laboratory
LFO – Livermore Field Office
LLNL – Lawrence Livermore National Laboratory
MMM - Material Management and Minimization
NA – Not Applicable
NCTIR - Nuclear Counterterrorism and Incident Response Program
NNSS – Nevada National Security Site
NPAC - Nonproliferation and Arms Control
NR – Naval Reactors
NRF – Naval Reactors Facility
ORNL – Oak Ridge National Laboratory
PM – Production Modernization
PNNL – Pacific Northwest National Laboratory
PX – Pantex
R&D - Research and Development (DNN)
SM – Stockpile Management
SNL – Sandia National Laboratories
SRFO - Savannah River Field Office
SRS – Savannah River Site
SRT&E - Stockpile Research, Technology, and Engineering
STA – Secure Transportation Asset
TEC – Total Estimated Cost
WA – Weapons Activities
Y-12 – Y-12 National Security Complex

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Federal Salaries and Expenses

Federal Salaries and Expenses

Federal Salaries and Expenses
Proposed Appropriation Language

For National Nuclear Security Administration (NNSA) Federal Salaries and Expenses (FSE), [$475,000,000] *$538,994,000*, to remain available until September 30, [2024] *2025.* That of such amount, $17,000 shall be available for official reception and representation expenses.

Explanation of Changes

Changes to the appropriation language consist of revisions to the overall amount and the two-year period of availability. The FY 2024 Budget Request for NNSA FSE is $538,994,000, a $63,994,000 (13.5 percent) increase above the FY 2023 Enacted for the salaries, benefits, and other expenses for 2,006 federal full-time equivalents (FTEs), 1,980 paid from FSE and 26 paid through the Working Capital Fund.

Public Law Authorizations

- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-397 National Defense Authorization Act for Fiscal Year 2023
- P.L. 117-328 Consolidated Appropriations Act, 2023

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Federal Salaries and Expenses
Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
NNSA Federal Salaries and Expenses	**464,000**	**491,800**	**538,994**	**+47,194**	**+9.6%**
Use of Prior Year Balances	**0**	**-16,800**	**0**	**+16,800**	**-100.0%**
Total, NNSA Federal Salaries and Expenses	**464,000**	**475,000**	**538,994**	**63,994**	**+13.5%**

Federal Salaries and Expenses
Outyear Funding

($K)

	FY 2028 Request	FY 2028 Request	FY 2028 Request	FY 2028 Request
NNSA Federal Salaries and Expenses	**560,956**	**583,940**	**603,562**	**616,938**

Funding by Object Class

Salaries and Benefits: Provides $432,711,000 for salaries and benefits for the majority of the NNSA federal staff. It does not include funding for the federal staff supporting the Weapons Activities (WA) Secure Transportation Asset program or the Naval Reactors (NR) account. The NNSA workforce consists of a diverse cadre of scientists, engineers, project and program managers, foreign affairs specialists, and highly technical support staff that perform program and project management and appropriate oversight of the national security missions related to the WA account and the Defense Nuclear Nonproliferation account. The workforce is also comprised of mission support staff focusing on management and program analysis, contracting, security administration, miscellaneous administration, human resource management, emergency management, information technology management, budget analysis, accounting, legal services (general and patent attorney, paralegal specialist), operations research, miscellaneous clerk and assistant, public affairs, quality assurance, general business and industry, government information specialists, industrial hygiene, industrial property management, realty, equal employment opportunity, grants management, environmental protection specialist, safety and occupational health management, logistics management, computer engineering, records and information management, telecommunications, writing and editing, computer science, procurement clerical and technician, inventory management, financial management, psychology, safety and electrical engineering, and architecture.

NNSA staff is located throughout the United States, reflecting NNSA's work with the nuclear security enterprise. The staff is geographically located in Washington, DC; Germantown, Maryland; Albuquerque, New Mexico; and at eight federal field offices: Kansas City Field Office (Missouri); Lawrence Livermore Field Office (California); Los Alamos Field Office (New Mexico); Nevada Field Office (Nevada); Pantex Field Office (Texas); Y-12 Field Office (Tennessee); Sandia Field Office (New Mexico and California); and Savannah River Field Office (South Carolina).

Travel: Provides $15,494,000 for travel necessary to conduct NNSA business. Domestic travel provides management oversight, public outreach, travel related to training, and national security assistance and interface between NNSA Headquarters, NNSA Field Offices, DOE laboratories and production facilities, and local governments. International travel is a key element of NNSA's nonproliferation work to share the United States' long experience in managing special nuclear materials with partners around the world to achieve international nonproliferation and counterterrorism goals.

Support Services: Includes $21,778,000 for management and professional services for headquarters support offices and field offices to assist or train staff to achieve efficient and effective management and operation of activities and systems, including administrative support, funding for Environmental Safety and Health activities for General Counsel's support of the National Environmental Policy Act at Los Alamos Field Office, and the NNSA Graduate Fellowship Program (NGFP).

Other Related Expenses: Provides $69,011,000 for the following items:

- Training: Provides $4,989,000 for necessary learning, career development, and skills maintenance of the NNSA federal staff. It does not include training for the federal staff supporting the WA Secure Transportation Asset program or the Naval Reactors account which are supported by separate Program Direction accounts. Training includes valuable learning activities for NNSA Headquarters and Field Offices, and corporate training, as managed by the NNSA's Chief Learning Officer. The NNSA corporate training program encompasses the Technical Qualification Program and mandatory training (such as executive, managerial, and supervisory training). It also funds: Leadership Development Programs, Mid-Level Leadership Development Program, Executive Development Program, Career Paths, LinkedIn Learning, Organizational Development, 360 Assessments, Rotations, NNSA 1st Year (Onboarding) Program, Mentoring, Coaching, and other learning events. NNSA's goal is to proactively address future workforce needs and Administration priorities, advance employee competencies, and demonstrate NNSA's commitment to the strategic development of all employees to allow them to reach their fullest potential.

- Space and Occupancy: Provides $19,297,000 to support office space costs and minor renovations at headquarters and operations costs at the field offices. Maintenance and recapitalization projects at the Field Offices are funded from Weapons Activities, Infrastructure and Operations.

- Working Capital Fund: Provides $36,888,000 for FSE's contribution to the Department of Energy's (DOE) Working Capital Fund (WCF). The FSE contribution includes funding for DOE's overseas presence for administrative and operational support to Departmental personnel. The Department's overseas presence business line funds 26 FTEs, including 24 DOE FTES in 21 diplomatic missions and 2 Headquarters FTEs for transition to and from overseas locations. This supports both federal employees and locally employed staff and reimburses the Department of State for International Cooperative Administrative Support Services and Capital Security Cost Sharing charges. The Department's WCF budget chapter included in Volume 2 provides details on all programs funded through the WCF. There are differences between NNSA's budget for WCF and the amounts allocated to NNSA in the WCF budget included in Volume 2. These differences will be addressed during execution of the FY 2024 Request. Charges for Overseas Presence are to be derived from previous actual usage of these services by program offices. The annual bill for these charges covers the direct costs of the program and is to be allocated to program offices based on their share of usage in the last completed FY at the time of budget formulation.

- Other Expenses: Provides $7,837,000 in funding for activities required for NNSA's federal personnel, including field site investigations in coordination with the DOE General Counsel, headquarters security investigations costs, other miscellaneous procurements, such as potential settlements; and funding for Reception and Representation funds ($17,000).

Highlights of the FY 2024 Budget Request

The FY 2024 Request supports a federal staff of 2,006 FTEs providing appropriate oversight to ensure NNSA can meet growing mission requirements and commitments including modernizing the nuclear deterrent, recapitalizing the aging infrastructure, and continuing to meet the requirements of nonproliferation and counterterrorism programs.

FY 2024 - FY 2028 Strategy

NNSA will use a variety of innovative methods to grow and shape the professional staff including recruitment events and available excepted service hiring authority. The NNSA will continue to monitor the evolving need for federal oversight in support of the nuclear modernization missions and adjust future staffing plans accordingly. The NNSA is committed to strengthening recruitment and hiring for its workforce. The NNSA established a full-time recruitment team that is focused on conducting outreach and recruitment for NNSA's mission critical occupations. This includes agency-sponsored career fairs, in which candidates can discuss career opportunities with hiring managers and have follow-up interviews, as well as career fairs targeted towards college students, military personnel and spouses, and individuals with disabilities. NNSA's recruitment and hiring actions will continue to support the Administration goals of promoting racial and economic equity across the Federal Government pursuant to Executive Order 13985, while promoting science and research and development. NNSA has continued to expand its recruitment and outreach efforts through sourcing and participating in numerous events to ensure the Agency is reaching all segments of society, to include all minority communities, African Americans, Asians, Hispanics, Native Hawaiian or Other Pacific Islanders, American Indians or Alaska Natives and women.

Entry Level Hires

NNSA continues to leverage a variety of sources to build the pipeline of future entry-level talent to include the Presidential Management Fellows Program, NNSA Graduate Fellowship Program (NGFP), Pathways Intern Program, Operation Warfighter Program, and Minority Servicing Institution Partnership Program. The NNSA supports a variety of programs to help train and recruit the next generation of leaders in managing the nuclear stockpile, nonproliferation, nuclear security, and international security. The entry level employees from these programs will become the qualified professionals who will sustain expertise in the NNSA nuclear security enterprise.

In FY 2024, the FSE appropriation will provide up to $1,531,500 for NGFP support and development activities.

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Funding by Congressional Control

	Funding ($K)			
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
NNSA Federal Salaries and Expenses	464,000	491,800	538,994	47,194
Use of Prior Year Balances	-	(16,800)		16,800
Total, NNSA Federal Salaries and Expenses	464,000	475,000	538,994	63,994
FTEs (paid from FSE)	1,797	1,893	1,980	87
FTEs (paid from WCF)	18	23	26	3
Total FTEs	1,815	1,916	2,006	90

Program Direction

	Funding ($K)			
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
NNSA Federal Salaries and Expenses				
Headquarters				
Salaries and Benefits	265,423	268,650	303,432	34,782
Travel	8,957	13,549	13,835	286
Support Services	18,063	17,478	18,065	587
Other Related Expenses	47,323	52,976	55,233	2,257
Total, Headquarters	339,766	352,653	390,565	37,912
Total, Full Time Equivalents	1,267	1,321	1,386	65
Livermore Field Office				
Salaries and Benefits	16,548	16,234	17,220	986
Travel	192	227	232	5
Support Services	427	853	871	18
Other Related Expenses	1,577	1,976	2,017	41
Total, Livermore Field Office	18,744	19,290	20,340	1,050
Total, Full Time Equivalents	74	80	82	2
Los Alamos Field Office				
Salaries and Benefits	17,480	20,884	22,116	1,232
Travel	286	289	295	6
Support Services	1,311	925	725	(200)
Other Related Expenses	456	807	409	(398)
Total, Los Alamos Field Office	19,533	22,905	23,545	640
Total, Full Time Equivalents	88	95	97	2

Program Direction, Continued

	Funding ($K)			
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
Sandia Field Office				
Salaries and Benefits	17,416	18,900	20,097	1,197
Travel	176	198	202	4
Support Services	417	477	487	10
Other Related Expenses	6,908	7,499	7,157	(342)
Total, Sandia Field Office	24,917	27,074	27,943	869
Total, Full Time Equivalents	85	85	87	2
Nevada Field Office				
Salaries and Benefits	15,967	17,143	18,225	1,082
Travel	134	178	181	3
Support Services	465	557	569	12
Other Related Expenses	636	1,105	793	(312)
Total, Nevada Field Office	17,202	18,983	19,768	785
Total, Full Time Equivalents	76	79	81	2
NPO Field Office				
Salaries and Benefits	23,734	27,514		(27,514)
Travel	390	420		(420)
Support Services	256	358		(358)
Other Related Expenses	2,180	2,469		(2,469)
Total, Pantex Field Office	26,560	30,761	-	(30,761)
Total, Full Time Equivalents	124	139	-	(139)

Program Direction, Continued

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
Pantex Field Office				
Salaries and Benefits			16,112	16,112
Travel			215	215
Support Services			182	182
Other Related Expenses			1,260	1,260
Total, Pantex Field Office	-	-	17,769	17,769
Total, Full Time Equivalents			76	76
Y-12 Field Office				
Salaries and Benefits			16,112	16,112
Travel			214	214
Support Services			183	183
Other Related Expenses			1,261	1,261
Total, Y-12 Field Office	-	-	17,770	17,770
Total, Full Time Equivalents	-	-	76	76
Kansas City Field Office				
Salaries and Benefits	7,283	8,169	8,651	482
Travel	98	172	175	3
Support Services	44	75	77	2
Other Related Expenses	308	754	770	16
Total, Kansas City Field Office	7,733	9,170	9,673	503
Total, Full Time Equivalents	39	40	41	1

Program Direction, Continued

	Funding ($K)			
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
Savannah River Field Office				
Salaries and Benefits	8,670	10,106	10,746	640
Travel	92	142	145	3
Support Services	574	607	619	12
Other Related Expenses	209	109	111	2
Total, Savannah River Field Office	9,545	10,964	11,621	657
Total, Full Time Equivalents	44	53	54	1
NNSA Federal Salaries and Expenses				
Salaries and Benefits	372,521	387,600	432,711	45,111
Travel	10,325	15,175	15,494	319
Support Services	21,557	21,330	21,778	448
Other Related Expenses	59,597	67,695	69,011	1,316
Subtotal, NNSA Federal Salaries and Expenses	464,000	491,800	538,994	47,194
Use of Prior Year Balances	-	(16,800)	-	16,800
Total, NNSA Federal Salaries and Expenses	464,000	475,000	538,994	63,994
FTEs (paid from FSE)	1,797	1,893	1,980	87
FTEs (paid from WCF)	18	23	26	3
Total FTEs	1,815	1,916	2,006	90

Support Services and Other Related Expenses

	Funding ($K)			
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs. FY 2023 Enacted
Support Services				
Management and Professional Services	18,757	21,030	21,478	+448
Environmental Safety and Health Support	300	300	300	+0
Corporate Project Management Support	2,500	0	0	+0
Total, Support Services	**21,557**	**21,330**	**21,778**	**+448**
Other Related Expenses				
Training	3,333	4,260	4,989	+729
Space and Occupancy Costs	14,367	19,630	19,297	-333
Headquarters Working Capital Fund (WCF)				
Supplies	547	547	517	-30
Building Occupancy	20,946	20,946	20,541	-405
Telecommunications	0	0	0	+0
Corporate Training Services	507	507	689	+182
Corporate Business Systems	2,405	2,405	2,405	+0
Overseas Representation	11,401	11,401	12,368	+967
Health Services	323	323	368	+45
TOTAL, Headquarters Working Capital Fund (WCF)	36,129	36,129	36,888	+759
Other Expenses				
Other Services	5,751	7,659	7,820	+161
Reception and Representation	17	17	17	+0
Subtotal, Other Expenses	5,768	7,676	7,837	+161
Total, Other Related Expenses	**59,597**	**67,695**	**69,011**	**+1,316**

Program Direction

	Funding ($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
NNSA Federal Salaries and Expenses				
Headquarters				
Salaries and Benefits	317,888	333,551	347,916	355,924
Travel	14,125	14,421	14,724	15,032
Support Services	18,444	18,831	19,226	19,630
Other Related Expenses	56,394	57,578	58,786	60,021
Total, Headquarters	406,851	424,381	440,652	450,607
Total, Full Time Equivalents	1,422	1,458	1,490	1,490
Livermore Field Office				
Salaries and Benefits	17,633	18,004	18,382	18,768
Travel	237	242	247	252
Support Services	889	908	927	946
Other Related Expenses	2,059	2,102	2,146	2,191
Total, Livermore Field Office	20,818	21,256	21,702	22,157
Total, Full Time Equivalents	82	82	82	82
Los Alamos Field Office				
Salaries and Benefits	22,647	23,122	23,608	24,104
Travel	301	308	314	321
Support Services	740	756	772	788
Other Related Expenses	418	426	435	444
Total, Los Alamos Field Office	24,106	24,612	25,129	25,657
Total, Full Time Equivalents	97	97	97	97

Program Direction, Continued

	Funding ($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Sandia Field Office				
Salaries and Benefits	20,579	21,011	21,453	21,903
Travel	206	211	215	220
Support Services	497	508	519	530
Other Related Expenses	7,307	7,461	7,618	7,778
Total, Sandia Field Office	28,590	29,191	29,805	30,431
Total, Full Time Equivalents	87	87	87	87
Nevada Field Office				
Salaries and Benefits	18,662	19,054	19,454	19,863
Travel	185	189	193	197
Support Services	581	593	605	618
Other Related Expenses	810	827	844	862
Total, Nevada Field Office	20,238	20,663	21,096	21,540
Total, Full Time Equivalents	81	81	81	81
Pantex Field Office				
Salaries and Benefits	17,584	19,062	19,462	19,871
Travel	220	224	229	234
Support Services	186	190	194	198
Other Related Expenses	1,286	1,313	1,341	1,369
Total, Pantex Field Office	19,276	20,789	21,226	21,672
Total, Full Time Equivalents	81	86	86	86

Program Direction, Continued

	Funding ($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Y-12 Field Office				
Salaries and Benefits	17,584	19,062	19,462	19,871
Travel	218	223	228	233
Support Services	187	191	195	199
Other Related Expenses	1,287	1,315	1,343	1,371
Total, Y-12 Field Office	19,277	20,791	21,228	21,674
Total, Full Time Equivalents	81	86	86	86
Kansas City Field Office				
Salaries and Benefits	8,859	9,045	9,235	9,429
Travel	179	182	186	190
Support Services	79	80	82	84
Other Related Expenses	786	803	820	837
Total, Kansas City Field Office	9,902	10,110	10,323	10,540
Total, Full Time Equivalents	41	41	41	41
Savannah River Field Office				
Salaries and Benefits	11,004	11,235	11,471	11,712
Travel	148	151	154	157
Support Services	632	645	659	673
Other Related Expenses	113	116	118	120
Total, Savannah River Field Office	11,897	12,147	12,402	12,662
Total, Full Time Equivalents	54	54	54	54

Program Direction, Continued

	Funding ($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
NNSA Federal Salaries and Expenses				
Salaries and Benefits	452,441	473,146	490,442	501,443
Travel	15,819	16,151	16,490	16,836
Support Services	22,235	22,702	23,179	23,666
Other Related Expenses	70,461	71,941	73,451	74,993
Total, NNSA Federal Salaries and Expenses	560,955	583,940	603,562	616,938
FTEs (paid from FSE)	2,026	2,072	2,104	2,104
FTEs (paid from WCF)	26	26	26	26
Total FTEs	2,052	2,098	2,130	2,130

Outyears
Support Services and Other Related Expenses

	Funding ($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Support Services				
Management and Professional Services	21,935	22,402	22,879	23,366
Environmental Safety and Health Support	300	300	300	300
Total, Support Services	**22,235**	**22,702**	**23,179**	**23,666**
Other Related Expenses				
Training	5,094	5,201	5,310	5,422
Space and Occupancy Costs	17,681	18,052	18,431	18,818
Headquarters Working Capital Fund (WCF)				
Supplies	528	539	550	562
Building Occupancy	22,993	23,477	23,970	24,474
Telecommunications	0	0	0	0
Corporate Training Services	703	718	733	748
Corporate Business Systems	2,456	2,507	2,560	2,613
Overseas Representation	12,628	12,893	13,164	13,440
Health Services	376	384	392	400
TOTAL, Headquarters Working Capital Fund (WCF)	39,684	40,518	41,368	42,238
Other Expenses				
Other Services	7,985	8,153	8,325	8,498
Reception and representation	17	17	17	17
Subtotal, Other Expenses	8,002	8,170	8,342	8,515
Total, Other Related Expenses	**70,461**	**71,941**	**73,451**	**74,993**

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted
Salaries and Benefit $387,600,000	**Salaries and Benefits $432,711,000**	**Salaries and Benefits +$45,111,000**
• Provides support for an NNSA federal staff of 1,893 FTEs, not including 23 that are funded through the WCF. • Includes 4.6% pay raise and 5% benefit escalation.	• Provides support for an NNSA federal staff of 1,980 FTEs, not including 26 that are funded through the WCF. • Includes 5.2% pay raise and 5% benefit escalation.	• Increase reflects a 5.2% pay raise and 5% benefit escalation. • Increase supports 87 additional FTEs primarily in support of Defense Programs to meet growing mission requirements and commitments including modernizing the nuclear deterrent and recapitalizing the aging infrastructure.
Travel $15,175,000	**Travel $15,494,000**	**Travel +$319,000**
• Supports domestic and foreign travel necessary as part of NNSA's mission.	• Supports domestic and foreign travel necessary as part of NNSA's mission.	• Reflects 2.1% escalation.
Support Services $21,330,000	**Support Services $21,778,000**	**Support Services +$448,000**
• Includes Management and Professional Services; Environment Safety and Health support; and NGFP support.	• Includes Management and Professional Services; Environment Safety and Health support; and NGFP support.	• Reflects 2.1% escalation.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted
Other Related Expenses $67,695,000	**Other Related Expenses $69,011,000**	**Other Related Expenses +$1,316,000**
• Includes FSE's contribution to the DOE WCF ($36,129,000). • Provides funding for Space and Occupancy costs at Headquarters and field sites ($19,630,000). • Provides necessary training and skills maintenance of the NNSA federal staff to address future workforce needs and administration priorities, advance employee competencies, and demonstrate NNSA's commitment to the strategic development of all employees ($4,260,000). • Includes funding for miscellaneous procurements ($7,676,000).	• Includes FSE's contribution to the DOE WCF ($36,888,000). • Provides funding to support office space costs and minor renovations at headquarters and operations costs at the field offices. • Provides necessary training and skills maintenance of the NNSA federal staff to address future workforce needs and administration priorities, advance employee competencies, and demonstrate NNSA's commitment to the strategic development of all employees ($4,989,000). • Includes funding for miscellaneous procurements ($7,837,000).	• Reflects 2.1% escalation. • Space and Occupancy reflects the realignment of scope for Field Office maintenance and recapitalization costs to Weapons Activities, Infrastructure and Operations, adjusted for escalation (-$333,000); funding for Field Office operations costs will remain in FSE. • Training reflects an increase to support career development and skills maintenance of an NNSA federal staff level of 2,006 FTEs (+$729,000).

DEPARTMENT OF ENERGY
Funding by Site
Federal Salaries and Expenses - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Argonne National Laboratory			
Program Direction - National Nuclear Security Administration	1,200	1,200	1,200
Total Argonne National Laboratory	**1,200**	**1,200**	**1,200**
Brookhaven National Laboratory			
Program Direction - National Nuclear Security Administration	7	7	7
Total Brookhaven National Laboratory	**7**	**7**	**7**
Carlsbad Area Office			
Program Direction - National Nuclear Security Administration	1	1	1
Total Carlsbad Area Office	**1**	**1**	**1**
Chicago Operations Office			
Program Direction - National Nuclear Security Administration	7	7	7
Total Chicago Operations Office	**7**	**7**	**7**
Idaho National Laboratory			
Program Direction - National Nuclear Security Administration	1,126	1	1
Total Idaho National Laboratory	**1,126**	**1**	**1**
Kansas City Site Office			
Program Direction - National Nuclear Security Administration	7,733	9,170	9,673
Total Kansas City Site Office	**7,733**	**9,170**	**9,673**
Lawrence Livermore National Laboratory			
Program Direction - National Nuclear Security Administration	1,100	1,100	1,100
Total Lawrence Livermore National Laboratory	**1,100**	**1,100**	**1,100**
Livermore Site Office			
Program Direction - National Nuclear Security Administration	17,644	18,190	20,340
Total Livermore Site Office	**17,644**	**18,190**	**20,340**
Los Alamos Site Office			
Program Direction - National Nuclear Security Administration	19,533	22,905	23,545
Total Los Alamos Site Office	**19,533**	**22,905**	**23,545**
National Energy Technology Lab			
Program Direction - National Nuclear Security Administration	2,012	125	125
Total National Energy Technology Lab	**2,012**	**125**	**125**
Nevada Field Office			
Program Direction - National Nuclear Security Administration	17,199	18,980	19,768
Total Nevada Field Office	**17,199**	**18,980**	**19,768**
Nevada National Security Site			
Program Direction - National Nuclear Security Administration	3	3	3
Total Nevada National Security Site	**3**	**3**	**3**
NNSA Albuquerque Complex			

DEPARTMENT OF ENERGY
Funding by Site
Federal Salaries and Expenses - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Program Direction - National Nuclear Security Administration	458	660	660
Total NNSA Albuquerque Complex	**458**	**660**	**660**
NNSA Production Office (NPO)			
Program Direction - National Nuclear Security Administration	26,420	30,828	35,539
Total NNSA Production Office (NPO)	**26,420**	**30,828**	**35,539**
Oak Ridge National Laboratory			
Program Direction - National Nuclear Security Administration	7	7	7
Total Oak Ridge National Laboratory	**7**	**7**	**7**
Pacific Northwest National Laboratory			
Program Direction - National Nuclear Security Administration	1,500	1,500	1,532
Total Pacific Northwest National Laboratory	**1,500**	**1,500**	**1,532**
Richland Operations Office			
Program Direction - National Nuclear Security Administration	7	7	7
Total Richland Operations Office	**7**	**7**	**7**
Sandia Site Office			
Program Direction - National Nuclear Security Administration	24,459	26,414	27,283
Total Sandia Site Office	**24,459**	**26,414**	**27,283**
Savannah River Operations Office			
Program Direction - National Nuclear Security Administration	9,552	10,971	11,621
Total Savannah River Operations Office	**9,552**	**10,971**	**11,621**
Washington Headquarters			
Program Direction - National Nuclear Security Administration	334,032	349,724	386,575
Total Washington Headquarters	**334,032**	**349,724**	**386,575**
Total Funding by Site - Federal Salaries and Expenses	**464,000**	**491,800**	**538,994**

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Weapons Activities

Weapons Activities

Weapons Activities
Proposed Appropriation Language

For Department of Energy expenses, including the purchase, construction, and acquisition of plant and capital equipment and other incidental expenses necessary for atomic energy defense weapons activities in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion, *$18,832,947,000*, to remain available until expended: *Provided,* That of such amount, *$118,056,000* shall be available until September 30, *2025*, for program direction.

Explanation of Change

The FY 2024 Budget Request provides a 10.0% increase from FY 2023 Enacted to execute five warhead modernization programs; continue restoring and refurbishing production capability, including the capability to produce 80 pits per year as close to 2030 as possible; and maintain Stockpile Research, Technology, and Engineering capabilities that are used every day to execute all NNSA programs.

Public Law Authorizations

- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-397, National Defense Authorization Act for Fiscal Year 2023
- P.L. 117-328, Consolidated Appropriations Act, 2023
- P.L. 117-81, National Defense Authorization Act for Fiscal Year 2022
- P.L. 117-103, Consolidated Appropriations Act, 2022

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Weapons Activities

	($K)				
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Weapons Activities	**15,920,000**	**17,116,119**	**18,832,947**	**+1,716,828**	**+10.0%**

Overview
Programs funded in the Weapons Activities appropriation support the Nation's current and future defense posture and necessary nationwide infrastructure of science, technology, engineering, and production capabilities without resuming underground nuclear explosive testing. Weapons Activities provides for the maintenance and refurbishment of nuclear weapons to continue sustained confidence in their safety, reliability, military effectiveness; investment in scientific, engineering, manufacturing capabilities for certification of the enduring nuclear weapons stockpile; and manufacture of nuclear weapon components. Weapons Activities also provides for maintenance and investment in the National Nuclear Security Administration (NNSA) nuclear complex infrastructure to be more responsive and resilient.

NNSA's Management and Operating (M&Os) contractors employ approximately 57,000 people across the enterprise, predominantly at eight geographical sites, including Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), Los Alamos National Laboratory (LANL), Nevada National Security Site (NNSS), Pantex Plant (PX), Y-12 National Security Complex (Y-12), Kansas City National Security Campus (KCNSC), and Savannah River Site (SRS). NNSA M&O partners are managed by a Federal workforce composed of civilian and military staff. Additional details about these programs will be included in the FY 2024 Stockpile Stewardship and Management Plan (SSMP).

Highlights and Major Changes in the FY 2024 Budget

Stockpile Management

Stockpile Management maintains a safe, secure, reliable, and effective nuclear weapons stockpile. The Stockpile Management program encompasses five areas that directly support the nation's nuclear weapons stockpile. **Stockpile Major Modernization** will continue Phase 6.6 (*Full-Scale Production*) activities for the B61-12 LEP and W88 ALT 370; continue Phase 6.4 (*Production Engineering*) activities for the W80-4 LEP; continue Phase 6.3 (*Development Engineering*) activities for the W87-1 Modification Program; and continue Phase 2 (*Feasibility Study and Design Options*) for the W93 Program. **Stockpile Sustainment** will provide activities to include maintenance, limited life component exchanges, minor alterations, surveillance, assessment, surety studies plus capability development, and management activities for each Stockpile System and Multi-Weapon Systems and will continue Phase 6.3 (Development Engineering) activities for the W76-1/2 Mk4B. **Weapons Dismantlement and Disposition (WDD)** will provide safe and secure dismantlement of nuclear weapons and components in accordance with the Nuclear Weapons Stockpile Plan, and **Production Operations (PO)** will sustain production-enabling capabilities and capacities, including process improvements and investments focused on increased efficiency of production performance. **Nuclear Enterprise Assurance (NEA)** will prevent, detect, and mitigate potential consequences of subversion, both to the stockpile and to the associated capabilities to design, produce, and test nuclear weapons.

<u>Stockpile Major Modernization</u>
The Stockpile Major Modernization program extends the lifetime of the nation's nuclear stockpile while addressing required updates, replacing aging or obsolete components to ensure continued service life, as well as enhancing security and safety features. This subprogram is where all the approved warhead acquisition programs are conducted. The acquisition programs are necessary to extend the expected life of stockpile systems for an additional 20 to 30 years. NNSA, in conjunction with the Department of Defense (DoD), executes an LEP following the Phase 6.X process guidelines, which provides a framework to conduct and manage refurbishment activities for existing weapons. For the purposes of this justification, "refurbishment" refers to all nuclear weapon alterations and modifications, including LEPs, modernization, and revised military requirements. The W93 Program modernization activity will use the joint DOE/NNSA-DOD Phase 1-7

weapons acquisition process that is very similar to the Phase 6.X process. The seven phases consist of Phase 1 (Concept Assessment), Phase 2 (Feasibility Study and Design Options), Phase 2A (Design Definition and Cost Study), Phase 3 (Developmental Engineering), Phase 4 (Production Engineering), Phase 5 (First Production), Phase 6 (Full-Scale Production/Sustainment), and Phase 7 (Retirement, Dismantlement, and Disposal).

Stockpile Sustainment
The Stockpile Sustainment program directly executes maintenance, surveillance, assessment, surety, and management activities for all enduring weapons systems in the stockpile. The program includes the B61, W76, W78, W80, B83, W87, and W88 Stockpile Systems, and Multi-Weapon Systems.

Weapons Dismantlement and Disposition
The Weapons Dismantlement and Disposition (WDD) program provides weapon dismantlements, safety studies on retired systems, material characterization, legacy component disposition, and the disposal of retired weapon parts. Includes activities for technical analysis needed to dismantle and safely store weapons being removed from the stockpile.

Production Operations
The Production Operations (PO) program is a multi-weapon system manufacturing-based program that drives individual site production capabilities and capacity for the stockpile sustainment and modernization programs, including limited life component production, weapon assembly, and disassembly operations. Production Operations also provides production equipment maintenance, and maintenance/calibration services for manufacturing operations to meet Department of Defense (DOD) War Reserve requirements. Production Operations scope covers sustainment of labor required for weapon systems capabilities that enable individual weapon production and are not specific to one material stream. Facility major modernization and construction activities are not part of this budget subprogram and are covered in other parts of the Weapons Activities account.

Nuclear Enterprise Assurance (NEA)
The Nuclear Enterprise Assurance program ensures the Nuclear Security Enterprise (NSE) actively manages subversion risks to the nuclear weapons stockpile and associated design, production, and testing capabilities. Digital technologies introduce new vulnerability characteristics and multiple new susceptible pathways that if compromised can produce unacceptable physical impacts to safety, the environment, weapon performance, and loss of capabilities. Through nuclear weapon digital assurance (NWDA), NEA enables risk-managed adoption of leading-edge technologies to meet emerging military requirements and reduce modernization schedules and costs. NEA maintains a team of multi-disciplinary experts who perform rapid assessments, develop tools and assurance methods, and provide recommended mitigations. Close coordination is maintained across NNSA and other agencies to stay informed of current threats and best practices.

Production Modernization
Production Modernization is responsible for modernizing the facilities, infrastructure, and equipment that produce materials and components to meet stockpile requirements and maintain the Nation's nuclear deterrent. The program encompasses five major subprograms that sustain the Nation's nuclear weapons stockpile.

1. The Primary Capability Modernization program consolidates the management of primary-stage material processing and component production capabilities in the National Nuclear Security Administration's (NNSA) nuclear security enterprise. The program includes (1) Plutonium Modernization and (2) High Explosives and Energetics Modernization.
2. The Secondary Capability Modernization program restores and enhances manufacturing capabilities for the secondary stage to the required levels in the nuclear security enterprise. This includes ensuring the availability of strategic materials and other sub-component streams necessary for the secondary stage, as well as modernizing the facilities and operations required to process these materials, fabricate them into parts, and assemble the final components. The program includes (1) Uranium Modernization, (2) Depleted Uranium Modernization, (3) Lithium Modernization, and (4) Special Materials.

3. The Tritium and Domestic Uranium Enrichment program consists of two parts: (1) Tritium Modernization produces, recovers, and recycles tritium to support national security requirements and (2) Domestic Uranium Enrichment (DUE) establishes a reliable supply of enriched uranium to support U.S. national security needs.
4. The Non-Nuclear Capability Modernization (NNCM) program modernizes the capabilities needed the for design, qualification, production, and surveillance of non-nuclear components for multiple weapon systems. NNCM activities include recapitalizing existing equipment and infrastructure, developing new capabilities, providing additional capacity, and implementing strategies to drive efficiencies.
5. The Capability Based Investments (CBI) program executes projects for equipment, tools, supporting facilities, and infrastructure directly related to enduring, multi-program weapon activity capabilities, mission deliverables, and management of programmatic risk across the nuclear security enterprise.

Primary Capability Modernization

The Primary Capability Modernization program consolidates the management of primary-stage material processing and component production capabilities in the NNSA nuclear security enterprise. The program includes *(1) Plutonium Modernization and (2) High Explosives and Energetics Modernization.*

The Plutonium Modernization program provides funding for efforts across the nuclear security enterprise to restore the Nation's capability to produce 80 pits per year (ppy). NNSA will provide additional details regarding Plutonium Modernization activities to Congressional staff through quarterly pit production briefings, as required by the FY 2020 Energy and Water Development and Related Agencies Appropriations Act. NNSA remains committed to achieving the pit production capability goals on the path to 80 ppy, including the capability to produce not less than 30 pits at LANL.

The High Explosives and Energetics (HE&E) program focuses on modernization and prioritization of High Explosives (HE) processing facilities and qualification of high explosive, pyrotechnic, and propellant materials for supplying the nuclear security enterprise across five M&O sites (Pantex Plant, SNL, LANL, LLNL, and NNSS). The HE&E program enables the production of HE and energetic materials required for an effective stockpile, including the main charge, boosters, detonators, actuators, timer/drivers, spin rockets, and the materials necessary to achieve nuclear weapon safety and security.

Secondary Capability Modernization

The Secondary Capability Modernization includes capabilities for the secondary stage of nuclear weapons in the nuclear security enterprise. This includes ensuring the availability of strategic materials and other sub-component material streams that are managed by NNSA, as well as modernizing the facilities and operations required to process these materials, fabricate, and assemble the final components. The program includes (1) Uranium Modernization, (2) Depleted Uranium Modernization, (3) Lithium Modernization, (4) Special Materials, (5) the Lithium Processing Facility (LPF), and (6) the Uranium Processing Facility (UPF). The Secondary Capability Modernization subprograms modernize reconstitute and upgrade capabilities and capacity to provide a robust, flexible, and responsive nuclear security enterprise. The subprograms extend the life of facilities and equipment; mature and insert new technologies for better, safer, and more efficient processes; and construct facilities to support future requirements.

FY 2024 includes the new subprogram formulated to develop a modern production capability at Y-12 to produce certified Special Materials components to support future weapon system demands.

Major Subprogram Descriptions:

Uranium Modernization provides funding to modernize enriched uranium operations to ensure delivery of secondary components needed to maintain the stockpile and support the Naval Reactors Program and Nonproliferation programs.

Depleted Uranium Modernization enables the restart of lapsed capabilities so NNSA can meet imminent weapons delivery mission requirements. These capabilities lapsed in the early 2000s due to the reuse of materials, low-demand signals, and prioritization of other activities. These capabilities include feedstock procurement, restarting and maintaining DU and DU-niobium alloying and manufacturing capabilities, and investing in key new technologies. The capability to produce, process, and handle depleted uranium supports several key missions within the nuclear security enterprise, from providing components for LEPs to the down-blending of HEU to low-enriched uranium.

Lithium Modernization maintains the production of the nation's enriched lithium supply in support of Defense Programs, the DOE Office of Science, the Department of Homeland Security, and other customers. In addition, the program manages technology development that will improve the efficiency and reliability of the existing lithium capability and the Lithium Processing Facility (LPF).

Special Materials provides funding to develop and deploy a new modern production capability for new component technologies that will be used in all future canned subassemblies. In the late 2000s, the NNSA discontinued the legacy process used to produce certain components due to safety concerns. These new technologies will utilize materials that meet the performance requirements and are less hazardous to use than legacy materials. Additionally, there is no existing capability to produce Special Materials components within the Nuclear Security Enterprise which is one of the NNSA Defense Program's top risks.

Tritium and Domestic Uranium Enrichment

The Tritium Modernization and Domestic Uranium Enrichment (DUE) program is responsible for producing tritium and supplying unobligated low-enriched uranium to support national security needs. *The program includes* (1) Tritium Modernization and (2) Domestic Uranium Enrichment.

The Tritium Sustainment and Modernization program operates the national capability for producing tritium. The Tritium supply chain's capacity is increasing as part of a multi-year plan to reliably meet national security requirements. NNSA is producing tritium by irradiating tritium producing burnable absorber rods (TPBARs) in two TVA reactors during normal 18-month operating cycles. Tritium is extracted from the TPBARs at the Tritium Extraction Facility (TEF) at SRS. The tritium inventory is required to meet national security requirements, including support for limited-life component exchanges of tritium reservoirs that are deployed in the stockpile. The program establishes tritium production schedules, based on detailed computational models and annual tritium reconciliations, that maintain required tritium inventories, including reserve quantities. Production planning takes into consideration the material that is constantly being recovered and recycled from deployed reservoirs, including those from weapon dismantlements. The program also supports tritium science, technology, and development to maintain a reliable tritium supply chain.

The Domestic Uranium Enrichment program is responsible for ensuring a reliable supply of enriched uranium to support U.S. national security needs. Since the closure of the Paducah Gaseous Diffusion Plant in 2013, the United States has lacked the capability to produce enriched uranium free of peaceful use obligations (i.e., unobligated). DOE/NNSA requires unobligated enriched uranium to fuel reactors that produce tritium for nuclear weapons and to power the nuclear Navy. The DUE program is implementing a three-pronged strategy to supply current enriched uranium needs and re-establish a supply of enriched uranium to meet long-term needs. First, NNSA seeks to ensure and extend availability of its unobligated LEU fuel supply through the early 2040s by down-blending excess HEU. Second, DUE is preserving and advancing uranium enrichment expertise and technology to meet current and future U.S. government needs. Third, DUE is executing the acquisition process to re-establish a long-term supply of enriched uranium to support future U.S. national security needs.

Non-Nuclear Capability Modernization

The Non-Nuclear Capability Modernization (NNCM) program executes projects to ensure the enduring availability of non-nuclear capabilities for multiple weapon systems. The NNCM program is responsible for all non-nuclear components external to the primary or secondary stage in the nuclear explosive package (NEP). Non-nuclear components enable critical functionality in the warhead including arming, fuzing, and firing, key safety and use control features, and other vital functions. Providing these functions requires a wide range of components encompassing radiation-hardened microelectronics, neutron generators, gas transfer systems, power sources, electrical assemblies, cables, connectors, structural elements, pads/cushions, and a multitude of other parts that are incorporated into the systems that support or weaponize the NEP. The NNCM program modernizes the extensive suite of infrastructure and equipment required to support the non-nuclear component lifecycle inclusive of design, development, qualification, production, and surveillance.

These capabilities ensure that components can survive environments encountered throughout the stockpile to the target sequence and over the life of the weapon.

Capability Based Investments
The Capability Based Investments (CBI) program executes projects to replace or enhance core enterprise capabilities through the recapitalization of high-risk of failure tests, measurements, and production equipment. CBI addresses enduring, multi-program requirements through discrete, short-duration projects. These investments recapitalize scientific and manufacturing capabilities that have degraded due to aging, broken, or outdated equipment and supporting systems. CBI activities primarily include capital equipment purchases and minor construction projects that enable the installation and use of the equipment and associated capabilities. These investments address needs beyond any single facility, campaign, or weapon system and are essential to achieving DP mission objectives. The CBI portfolio provides agility and reduces programmatic risk to mission across the nuclear security enterprise and ensures needed capabilities are available for stockpile stewardship, sustainment, and modernization.

Stockpile Research, Technology, and Engineering
The SRT&E portfolio provides the scientific foundation for science-based stockpile decisions and actions, develops the personnel required to support the current and future stockpile, and includes the capabilities, tools, and components needed to support all missions. Funding requested for FY 2024 supports the continued implementation of the Enhanced Capabilities for Subcritical Experiments (ECSE) and preparations for NNSA's first exascale high-performance computing system. These two capabilities are required to meet W80-4 LEP confirmation experiment and reduce uncertainty in the W87-1 Modification certification. In addition to the procurement and implementation of NNSA's first exascale machine, the funding supports the development and deployment of improved physics and engineering codes needed to support stockpile decisions to operate on this new platform. Funding in this area also supports the development of new materials, technologies, and processes to modernize our nuclear systems and production complex, as well as supporting several experimental testbed capabilities. This is accomplished through warhead component and production technology development and maturation.

Assessment Science
The Assessment Science program provides the knowledge and expertise needed to maintain confidence in the nuclear stockpile in the absence of nuclear explosive testing. Capabilities developed and maintained in the Assessment Science program support the entire Nuclear Security Enterprise, providing: (1) the scientific underpinnings required to conduct annual assessments of weapon performance and certification of life extension programs (LEPs); (2) the scientific insight to inform our understanding of the impacts of surveillance findings to ensure that the nuclear stockpile remains safe, secure, and effective; and (3) the core technical expertise required to be responsive to technical developments and geopolitical drivers. Assessment Science also facilitates the assessment of current weapon and weapon component lifetimes, the development and qualification of modern materials and manufacturing processes, the exploration of concepts for component reuse, and the development of modern safety concepts for sustainment.

Engineering and Integrated Assessments
The Engineering and Integrated Assessments program is responsible for ensuring system agnostic survivability in present and future stockpile-to-target sequences (STS) and ensures a responsive nuclear deterrent through collaborative partnerships, proactive integration, and assessments. This program supports four key mission areas: (1) strengthening the science, technology, and engineering base by maturing advanced technologies to improve future weapon systems, (2) providing tools for qualifying weapon components and certifying weapons without nuclear explosive testing, (3) supporting annual stockpile assessments through improved weapons surveillance technologies and warhead component aging assessments, and (4) providing capabilities that accelerate the nuclear weapons acquisition process and strengthen the ability of the United States to respond to unexpected developments that could threaten nuclear security.

Inertial Confinement Fusion
The Inertial Confinement Fusion (ICF) program provides high energy density (HED) science capabilities and expertise that support research and testing across the breadth of the Stockpile Stewardship Program. Its two-fold mission is to meet

immediate and emerging HED science needs to support the deterrent of today, and to advance the R&D capabilities necessary to meet those needs for the deterrent of the future. The ICF program enables access to and study of the HED regime through (1) the design and execution of complex physics experiments to improve our fundamental science understanding, (2) the development of instrumentation to diagnose physics phenomena at the extreme temperature, pressure, and density conditions relevant to nuclear weapons performance, and (3) the development and operation of experimental facilities capable of reaching those conditions. The ICF program's flagship facilities, the National Ignition Facility (NIF) at LLNL, Z at SNL, and Omega at the University of Rochester's Laboratory for Laser Energetics (LLE), represent a complementary set of capabilities designed to meet the diverse needs of weapons physics, the pursuit of ignition, and the exploration of fundamental HED science.

Advanced Simulation and Computing

The Advanced Simulation and Computing (ASC) program provides high-end simulation capabilities (e.g., modeling codes, computing platforms, and supporting infrastructure) to meet the requirements of the SSP. Modeling the complexity of nuclear weapons systems is essential to maintaining confidence in the performance of our stockpile without underground nuclear testing. The ASC program provides the weapon codes that provide the integrated assessment capability supporting annual assessment and future sustainment program qualification and certification of the stockpile. ASC is also an integral element of the Stewardship Capability Delivery Schedule (SCDS). ASC provides critical capabilities that help inform decision-making related to the sustainment of the nuclear stockpile in support of U.S. national security objectives. The program also coordinates with NNSA and other government agencies, including the Intelligence Community, to support nonproliferation, emergency response, nuclear forensics, and attribution activities.

Weapon Technology and Manufacturing Maturation

The Weapon Technology and Manufacturing Maturation (WTMM) program is responsible for developing agile, affordable, assured, and responsive technologies and capabilities for nuclear stockpile sustainment and modernization to enable Defense Programs' mission success. The efforts enable evolving stockpile and production capabilities away from legacy systems and processes, providing for resilience, and laying the foundation for future success of the nuclear security enterprise. The core areas of work in FY 2024 include agile, assured, and affordable technologies; partnership with stakeholders to meet stockpile and customer requirements; qualification and certification; developing a skilled technical workforce and establishing enhanced capabilities.

Academic Programs and Community Support

Academic Programs was formerly a subprogram within the SRT&E portfolio improves program integration, agility, development, and alignment to critical workforce needs. Starting in FY 2024, NNSA is proposing a Community Capacity Building Program to provide benefits to underserved communities affected by the activities at NNSA sites. Academic Programs and Community Support enables robust and diverse science, technology, engineering, and mathematics (STEM) research for educational communities through a variety of methods of support. Investments in consortia and centers of excellence provide collaborative groups to tackle large questions through multi-disciplinary approaches, and they leverage preeminent scientists in relevant fields. Research grants and focused investigatory centers support individual principal investigators to foster a vibrant community that is responsive to new breakthroughs by providing flexibility for new ideas, diversity, and career growth. Specific support to minority serving institutions prepares a diverse workforce of world-class talent through strategic partnerships. Fellowships provide graduate students with key opportunities to connect with the NNSA missions and provide direct experiences at nuclear security enterprise sites. User facilities open opportunities for academic partners to use NNSA's cutting-edge research facilities and push frontiers of current scientific understanding. All Academic Programs and Community Support opportunities focus on quality science through competitive awards, connection with NNSA mission work at national security laboratories and nuclear weapons production facilities, and a view to the nuclear security enterprise's future needs and opportunities.

Infrastructure and Operations (I&O)

The Infrastructure and Operations program maintains, operates, and modernizes NNSA's infrastructure in a safe, secure, and cost-effective manner to support program execution while seeking to maximize return on investment and reduce enterprise risk. The program also plans, prioritizes, and constructs facilities and infrastructure to support all NNSA programs including DOE owned federal Field Offices, except for, programmatic construction projects, which are funded by the capability sponsor. Infrastructure and Operations consists of the following programs: Operations of Facilities, Safety and Environmental Operations, Maintenance and Repair of Facilities, Recapitalization, and Line-Item Construction Projects. Operations of Facilities funds the NNSA facilities to operate in a safe and secure manner and is critical to achieving the administration's plutonium, uranium, tritium, lithium, high explosives, and other mission objectives. This program includes essential support such as water and electrical utilities, safety systems, lease agreements, and activities associated with Federal, state, and local environmental, worker safety, and health regulations. The Safety and Environmental Operations program provides for the Department's Nuclear Criticality Safety Program (NCSP), Nuclear Safety Research and Development (NSR&D), Packaging subprogram, Long Term Stewardship (LTS) subprogram and Nuclear Materials Integration (NMI) subprogram. These activities support safe, efficient operation of the nuclear security enterprise through the provision of safety data, nuclear material packaging, environmental monitoring, and nuclear material tracking.

The Maintenance and Repair of Facilities program directly funds maintenance activities across the NNSA enterprise for the recurring day-to-day work required to sustain and preserve NNSA facilities in a condition suitable for their designated purpose. These efforts include predictive, preventive, and corrective maintenance activities to maintain facilities, property, assets, systems, roads, and vital safety systems. The Recapitalization program, comprised of the Infrastructure and Safety subprogram, is key to modernizing NNSA's infrastructure. A sustained investment in Recapitalization is needed to address numerous obsolete support and safety systems; revitalize facilities that are beyond the end of their design life; address climate adaptability and resilience; and improve the reliability, efficiency, and capability of core infrastructure to meet mission requirements. The Recapitalization program modernizes NNSA's infrastructure by prioritizing investments to improve the condition and extend the life of structures, capabilities, and systems thereby improving the safety and quality of the workplace. Recapitalization investments help achieve operational efficiencies and reduce safety, security, environmental, climate, and program risk. The program also includes minor construction and infrastructure upgrade projects, real property purchases, planning, general contractor support for construction project management, Other Project Costs (OPC) for Infrastructure and Operations funded mission enabling infrastructure, and deactivation and disposal of excess infrastructure. Infrastructure and Operations line-item construction projects are critical to revitalizing the infrastructure. These projects will replace obsolete, unreliable facilities and infrastructure to reduce safety and program risk while improving responsiveness, capacity, and capabilities.

Secure Transportation Asset

The Secure Transportation Asset (STA) supports safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material throughout the NSE. Nuclear weapon life-extension programs, limited-life component exchanges, surveillance, dismantlement, nonproliferation activities, and experimental programs rely on STA activities to ensure safe, secure, and on-schedule transport. The FY 2024 Request supports modernizing and sustaining STA transportation assets, including life extension of the Safeguards Transporter until it is replaced by the Mobile Guardian Transporter; vehicle sustainment; replacement armored tractors, escort, and support vehicles; upgrades of the Tractor Control Unit to accommodate for communications and security; and continued development and testing of the Mobile Guardian Transporter. The first Mobile Guardian Transporter production unit is planned for completion in FY 2028 and will begin a phased in approach to replace the current Safeguard Transporter. Program Direction resources in this account provide salaries and expenses for the secure transportation workforce, including Federal Agents.

Defense Nuclear Security

The Office of Defense Nuclear Security (DNS) leads, develops, and implements the National Nuclear Security Administration's (NNSA) security program to enable its nuclear security enterprise (NSE) missions. DNS provides protection for NNSA personnel, facilities, nuclear weapons, and materials from a full spectrum of threats, ranging from minor security incidents to acts of terrorism, at its national laboratories, production plants, processing facilities, and the Nevada National Security Site (NNSS). In addition, DNS provides nuclear security expertise for a broad set of evolving national security needs, in line with its core mission, such as those in defense nuclear nonproliferation, homeland security, and intelligence. Employing more than 1,700 Protective Force (PF) officers, DNS secures more than 5,000 buildings and protects more than 57,000 personnel.

Information Technology and Cybersecurity

The NNSA Office of the Associate Administrator for Information Management and Chief Information Officer (OCIO) is responsible for information management, information technology (IT), and cybersecurity for the NNSA enterprise. To effectively achieve this, the OCIO has implemented an organizational structure that supports its functions under three organizations: the Office of Information Technology, the Office of Cybersecurity, and the Office of Mission Integration.

The OCIO supports IT and cybersecurity services and solutions, which include continuous monitoring, cloud-based technologies, and enterprise security technologies (i.e., identity, credential, and access management). As a mission partner, OCIO ensures and enables the availability of a secure infrastructure for mission activities and information sharing for the NNSA and its mission partners. The office manages the IT portfolio, federal IT investments, services, and projects in alignment with the NNSA and the Department of Energy Office of the Chief Information Officer strategies, as well as other national policy drivers.

FY 2025 – FY 2028 Key Milestones

- **Stockpile Management**
  - Execute B61-12 aircraft integration activities with U.S. Air Force B-21 bomber and Dual Capable Aircraft in FY 2025, complete Retrofit Evaluation System Test (REST) and component testing in FY 2025 as well as complete Pantex Last Production Unit and life-of-program overbuilds in FY 2026. This leads to completion of bomb shipments to the Air Force, achieving Full Operational Capability and program close-out in FY 2026.
  - W88 ALT 370 will maintain component and system-level steady state production starting in FY 2026, execute REST surveillance scope, complete last production unit in FY 2026 leading to program closeout activities also in FY 2026.
  - W80-4 will conduct Air Force LRSO joint testing throughout FY 2025 to FY 2028, complete Production Definition and Documentation Review (PDDR) in FY 2026, produce the Final Weapon Development Report (FWDR), receive Phase 6.5 authorization, and then make the First Production Unit all in FY 2027, then conduct System and Warhead Production Steady State Gate, produce the System Production Review, and receive authorization for Phase 6.6 all in FY 2028.
  - Conduct, in conjunction with the Air Force, Sentinel GBSD environmental flight tests in Mk21A in FY 2024 and FY 2025, complete W87-1 Component Baseline Design Reviews in FY 2025, then complete W87-1 System Baseline Design Review, complete W87-1 Baseline Cost Report and enter Phase 6.4, and conduct, in conjunction with the Air Force, W87-1 JTA development flight tests with completion dates pending WDCR funding.
  - Complete W93 Program Phase 2 in FY 2025, complete W93 Program Phase 2A in FY 2025/2026 including the Weapon Design and Cost Report (WDCR) in FY 2026 then obtain W93 Program Phase 3 authorization in FY 2026, conduct joint testing with Navy on initial flight-testing development through FY 2026 and complete Conceptual Design Review in FY 2027.
  - Future Strategic Warhead will execute Phase 6.1 leading to Phase 6.2 authorization from the NWC in FY 2027.
  - Stockpile Sustainment will continue conducting surveillance program activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability, performance, and safety. In addition to routine surveillance, B61-12 will be integrated into the stockpile; W76 ALT 939 will complete final design review (FY 2025) and First Production unit (FPU) (FY 2027); W76/Mk4B Phase 6.5 will be authorized (FY 2025) and then Phase 6.6 (FY 2026); W78 JTA6R will achieve FPU in FY 2027; restart W80 ISA/MTAD development activities; conduct W80 disassembly activities for conversion to W80-4 in FY 2028; achieve W87 Operations Weapon System Article (OWSA) on Sentinel in FY 2028; and lastly deliver MWS digital capabilities that improve product realization processes and complete MWS engineering support for Tonopah Test Range radar recapitalization.
  - WDD will continue conducting dismantlement activities consistent with the Nuclear Weapons Stockpile Memorandum, reduce the size of legacy disposition inventories on site, eliminate excess power supplies from Pantex inventories and develop processes and procure equipment to support dismantlement of special CSAs.
  - Production Operations will increase critical skilled labor and address attrition to maintain scope and schedule, support detonator production at LANL and maintain critical Neutron Generator Enterprise.

- Nuclear Enterprise Assurance will address most significant subversion risks as determined by mission impact at sites, institutionalize NEA policy across NNSA, integrate cybersecurity risk management into existing and future weapon acquisition processes, and mature countersubversion tools and capabilities standards for the workforce.

- **Production Modernization**
  - Achieve 30 pits per year production capability (2026).
  - Achieve CD-4 approval for HESE.
  - Discontinue the uranium purification process in Building 9212, reducing operational and safety risks in the facility.
  - Fabricate and deliver ~11,000 TPBARs to TVA.
  - Complete KCNSC short-term expansion plan, FY 2028.
  - Meet current commitments that enable W80-4 and W87-1 modernization programs by FY 2025.

- **SRT&E**
  - Mature and build prototype technologies for cinematographic radiography for future hydrodynamic and sub-critical experiments to provide a robust test of the predictive capability of weapons design codes and help reduce the need for nuclear explosive testing.
  - Advance revolutionary radiography and other diagnostics as well as modernize data analysis techniques and models to increase learning from dynamic experiments (e.g., surrogate and plutonium experiments supporting stockpile assessments and LEP developments) through delivery of high-fidelity data, which may provide a better test of current codes, reducing the need for nuclear explosive testing.
  - Complete the 24-D-513 Z-pinch Experimental Underground System (ZEUS) Test Bed Facilities Improvement (ZTBFI), NNSS in preparation for dynamic neutron diagnosed subcritical experiments (NDSE) experiments in FY 2025, the installation of Advanced Sources and Detectors (ASD) project in FY 2029, execute subcritical experiments in the U1a Complex 03 Test Bed using NDSE in FY 2025, and execute subcritical experiments in the U1a Complex 100 Test Bed using ASD in FY 2030.
  - Modernize integrated design codes for sustained performance portability on next-generation, heterogeneous HPC systems.
  - Demonstrate a mature optical initiation system, technology readiness level (TRL) 5 & manufacturing readiness level (MRL) 3 for next insertion option such as the W93, continue focused development of a multi-point safety design concept that can be qualified for a future insertion opportunity, continue limited development of improved power management technologies tailored to modernized applications, and develop advanced safety mechanisms and demonstrate technologies on a relevant demonstrator.
  - Develop a distributed bus-based architecture (DBBA) that provides an electrically stable yet flexible digital interface that forms the key enabling element of a modular theme. This approach replaces the traditional highly optimized analog interface architectures used by existing weapons systems.
  - Demonstrate methodology for born qualified additively manufactured components using automated on-machine metrology and in-situ process monitoring to enable quicker production for future systems, stand up pilot plant to enable recycling and recovery of valuable special material for future systems, continue to work towards qualification of additively manufactured and particle injection molded high explosives and mock, continue to develop advanced coating technologies in time for the W93 and future systems.

- **Academic Programs and Community Support**
  - Post new funding opportunity announcements to continue programs
  - Support next cohorts of Stewardship Science Graduate Fellowship (SSGF), Laboratory Residency Graduate Fellowship (LRGF), and Computational Science Graduate Fellowship (CSGF) fellows
  - Partner with other federal agencies and/or programs to broaden the reach of the Minority Serving Institution Partnership (MSIPP) and Tribal Education Partnership Program (TEPP) with a goal of pursuing mission related STEM projects of mutual interest that will further enhance the educational and/or research capacity at MSIs.
  - Grow the number of university partners participating in MSIPP and TEPP to build their capacity and academic infrastructure in STEM and increase awareness of opportunities available within the NSE.

- Enhance visibility for computational science careers by supporting the CSGF program to ensure a pipeline of trained scientists and engineers to meet DOE/NNSA workforce needs in computational science.
- Support continued development and demonstration of technologies and methodologies to support effective Exascale computing in the context of science/engineering applications.

- **Infrastructure and Operations**
  - Provide support for pit production, with a focus on the LANL production mission of at least 30 pits per year, major modernization programs, and other NNSA missions such as nonproliferation and counterterrorism. The program also supports efforts to improve facility condition and continuing to modernize NNSA's infrastructure to reduce mission and safety risks through the application of an enterprise risk management methodology.
  - Support line-item construction investments largely directed to mission enabling infrastructure.
  - Seek operational efficiencies by deactivating and dispositioning facilities that are no longer needed, thereby reducing operations, maintenance, and recapitalization requirements.
- **Secure Transportation Asset**
  - Delivery of Mobile Guardian Transport FPU in FY 2028.
  - Life Cycle Replacement of first 737-400 in FY 2027.
  - Facility and minor construction projects across STA sites, including construction of the Training Command Multi-Use Facility, Agent Operations Central Command Federal Agent Facility, Agent Operations Western Command Military Operations in Urban Terrain Site, and indoor firing ranges at Agent Operations Central Command and Agent Operations Western Command.

- **Defense Nuclear Security**

  Physical Security Systems
  - Sustain counter uncrewed aircraft system (CUAS) operation at sites possessing Category 0/I quantities of special nuclear material (SNM).
  - Complete highest priority SIRP projects, which aligns with NNSA's priority to recapitalize security infrastructure.
  - Complete Caerus core deployments and continue transition of field equipment
  - Complete WEPAR project at Y-12 National Security Complex (Y-12).

- **Information Technology and Cybersecurity**
  - Implement Cloud based Enterprise Governance Risk and Compliance, enhancing the ability to analyze and share critical cybersecurity risk information and improving enterprise situational awareness.
  - Establish additional Centers of Excellence to improve and enhance cybersecurity operations throughout the enterprise in FY 2025.
  - Reinforce security posture for highly classified information and enhance the capability to share information with the Department of Defense by modernizing the network architecture as well as upgrading and enhancing security.
  - Provide classified IT infrastructure enhancements and improvements to support both the nuclear security and non-nuclear security activities across the DOE enterprise.
  - Develop architecture of the classified wireless network for non-pit production facilities.
  - Develop a roadmap to support and sustain advanced analytic capabilities, including artificial intelligence and machine learning, from the research and development phase to production and deployment.

FY 2022 Accomplishments
- **Stockpile Management**
  - B61-12 achieved FPU on the all-up-round at Pantex and Phase 6.6 authorization from the NWC. Completed seven system joint flight tests on the PA-200, F-16 Mid-Life Upgrade and F-35A aircraft platforms as well as completing the associated Aircraft Compatibility Control Drawings. All remaining system level qualification activities and design agency Qualification Engineering Release completed which enables Pantex B61-12 production to start.
  - W88 Alt 370 completed the final review of the Design review and Acceptance Group, delivered the IOC quantity of reentry body assemblies to the Navy, executed the Commander Evaluation Test 4, released both the Alt 370

Addendum to the W88 Final Weapon Development Report and the Alt 370 update to the W88 Major Assembly release and lastly received authorization to enter Phase 6.6.
  - W80-4 completed the System Baseline Design Review (BDR), the Program Protection Plan (PPP), the Nuclear Explosive Package Certification Plan and the draft Preliminary Weapon Development Report for Phase 6.4 entry. Joint testing with the Air Force Long-Range Stand-Off (LRSO) weapon included delivery and completion of FTU0-2 Firedown test, completion of ETU-3 for Separation and Control and completed the first powered flight. Began both the Baseline Cost Report development and the Preliminary Design Review and Acceptance Group.
  - W87-1 and the Air Force formalized and signed a W87-1/M21A Memorandum of Understanding as well as continued coordinated flight test requirement development. Cost of the program was estimated through the Weapon Design and Cost Report (WDCR).
  - W93 completed the Phase 6.1 study report, received NWC approval to commence Phase 6.2 and then directed Phase 6.2 activities for FY 2023. Also conducted the Technology Readiness Assessment and an M&O program cost estimate.
  - Stockpile Sustainment conducted surveillance activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability. IN addition, all Limited Life Components (LLCs) were delivered on schedule, continued planning for the W76 JTA3, implemented study to replace H1333B shipping containers, continued development of the W78 JTA6R, executed all planned W80 ALT 369 deliveries to the Air Force, conducted W87 integration activities to support Mk21 replacement fuze, met FPU for W88 ALT 940 Mechanical Module and Door Module and delivered Weapon Reliability Report to the DOD.
  - WDD met stockpile and naval reactor requirements through prioritized dismantlement schedules, maintained focus on Pantex FY 2022 dismantlement program, dispositioned weapon program components in order to keep legacy piles from growing, and conducted component characterization of hazards on time with no impact to worker safety.
  - Production Operations sustained the labor base that spans multiple programs to meet deliverables, maintained critical Production Process Equipment at approximately 98% availability, calibrated over 1,200 critical items of equipment, deployed and executed CNS Y-12 comprehensive corrective and preventative maintenance program activities, performed tritium process maintenance to support GTS production and accepted over 90,000 Sandia components at a 99% acceptance rate.

- **Production Modernization**
  - Produced 7 pit builds in PF-4 successfully to support process qualification and product certification toward WR pit production in 2023.
  - Completed specification for Triaminotrinitrobenzene (TATB) and PBX-9502.
  - Produced eleven production quality buttons of purified metal utilizing the Electrorefining Development Glovebox system.
  - Completed irradiation of 544 TPBARs in Cycle 4 and commenced irradiation of 1,104 TPBARs in Cycle 5.
  - Supported KCNSC manufacturing capacity expansion to meet PoR production requirements through 2028.
  - Replaced Lujan target to extend neutron research facility lifetime at LANSCE, LANL.

- **SRT&E**
  - The Assessment Science program made significant contributions aligned with the Pu aging strategic plan which advanced the core thrust areas of the Assess Lifetimes and Mitigate Aging pegpost.
  - Inertial Confinement Fusion program has made significant strides in reproducing the FY 2021 shot which has led to identification of target capsule features critical to >1 MJ fusion yield performance. ASC next-generation weapons codes demonstrated very good performance results on El Capitan early-access systems, which are composed of node technologies that's one generation before the final system's architectures.
  - Established a new production-level, unclassified restricted enclave at LANL for new HPC services in support of tri-lab remote computing environment; continued production operation of Trinity (ATS-1), Sierra (ATS-2) and trilab CTS-1 systems; achieved 89% completion of the Exascale Computing Facility Modernization (ECFM) construction project at LLNL; completed the B654 Low Conductivity Water Cooling Loop for future CTS systems at LLNL; and

installed power, cooling, and networking infrastructure for CTS-2 systems in conjunction with the 3MW power upgrade to the 725-East HPC Facility at SNL.
  - Completed the Ground Test 2 (GT2) and Ground Test 3B (GT3B) series of experiments demonstrating a new reentry vibration qualification workflow for a subsystem, a full system re-entry body in a Mk5-like envelope, and a modular full-system re-entry body.
  - Transitioned Small Ferroelectric Neutron Generator (SFENG) to W87-1. Its new detonator improves safety, performance, and shelf life; and its new cylindrical shape improves producibility.
  - Matured the Direct Cast production process to TRL 6 MRL 4, having produced high fidelity components in a simulated operational environment, thus transitioning the Direct Casting Technology Realization Team to NA-195 for further development and implementation into Y-12 production.
  - Achieved TRL 5 and MRL 3 for the thermal spray technology, and, transferred project to Production Modernization to make available as a future option.
  - Completed a first of its kind, Odin's Tesseract pRAD experiment at LANL that demonstrated near identical behavior between electrical and optical fire sets. This is a significant milestone in the development of an Optical Initiation system.

- **<u>Academic Programs and Community Support</u>**
  - Posted new funding opportunity announcements to continue programs.
  - Supported next cohorts of SSGF, LRGF, and CSGF fellows.
  - Partnered with other federal agencies and/or programs to broaden the reach of the MSIPP with a goal of pursuing mission related STEM projects of mutual interest that will further enhance the educational and/or research capacity at MSIs.
  - Grew the number of Tribal Colleges/University partners participating in the Tribal Education Partnership Program, supporting partnerships with national laboratories to build capacity and academic infrastructure.
  - Enhanced visibility for computational science careers by supporting the CSGF program to ensure a pipeline of trained scientists and engineers to meet DOE/NNSA workforce needs in computational science.
  - Supported continued development and demonstration of technologies and methodologies to support effective Exascale computing in the context of science/engineering applications.

- **<u>Infrastructure and Operations</u>**
  - Completed 41 Recapitalization projects and 9 Disposition projects – 34 assets demolished (56,453 sq ft), including 17 process-contaminated facilities.
  - Completed construction for the Emergency Operations Center project at Lawrence Livermore National Laboratory (LLNL) in California under the innovative Enhanced Minor Construction and Commercial Standards (EMC2) initiative. This project finished ahead of schedule and under budget with full incorporation of all contract add-on options.
  - Completed several construction projects including the John A. Gordon NNSA Albuquerque Complex and the TA-3 Substation project at Los Alamos National Laboratory.
  - Purchased the former LeMond Carbon Facility to establish the John M. Googin Technology Development Facility in December 2021.
  - Renewed offsite transportation approvals for six packages used to transport nuclear components and subcritical experiments.
  - The Nuclear Materials Management and Safeguards System (NMMSS) completed reconciliation for 321 NRC licensee facilities and 51 DOE/NSSA sites, produced and distributed 7,842 report products, and answered over 1,500 data inquiries and reporting assistance questions.
  - Conducted Long-Term Stewardship (LTS) scope to ensure continued protection of human health and the environment at NNSA LTS sites and adjacent areas.

- **Secure Transportation Asset**
  - Completed over 85 weapon/special nuclear materials shipments and made over 63 limited-life component deliveries without incident.
  - Completed the Baseline Design Review for the Mobile Guardian Transporter (MGT).
  - Completed several key milestones toward production of the Mobile Guarding Transporter (MGT) such as:
    - Released TA1 timeline and testing results.
    - Procured parts for the PPU build for the trailer assembly.
    - Released initial drawings for design testers.
    - Completed TA2 Over-the-Road Test.
    - Completed PPU Rolling Chassis build.
    - Commenced product specification releases to the Production Agency.
  - Awarded contract to construct the Agent Operations Western Command Vehicle Maintenance Facility in Albuquerque, New Mexico.

- **Defense Nuclear Security**
  - Successfully implemented Trusted Workforce 1.5 for the Department of Energy (DOE). This included submitting over 30,000 fingerprint requests and enrolling over 90% of DOE's clearance holders into the Report of Arrest and Prosecution Back system, which supports near real-time evaluation of clearance holders.
  - Initiated efforts to streamline security approvals for medically necessary personal electronic devices, which need to be introduced into specific secure areas.
  - Achieved Initial Operating Capability for CUAS platforms installed at NNSS and the Pantex Plant.
  - Reenergized collaboration activities between the Department of Defense (DOD) Office of Nuclear Matters and DNS. This effort focuses on opportunities to identify and implement improvements in how the two agencies harmonize their respective nuclear security programs, including threat assessments, technology development, policy, and other areas of mutual benefit.
  - Achieved Full Operating Capability for Portable Intrusion Detection System (PIDS) units. PIDS is a rapidly deployable detection system (compensatory measure), developed in partnership with DOD.
  - Broke ground on the Quadrant 1 Perimeter Intrusion Detection and Assessment System (PIDAS) refresh and completed the Post 8 Booth Replacement SIRP projects at Y-12.
  - Developed, tested, and implemented Local Area Nuclear Material Accountability System (LANMAS) software enhancements at all user sites.
  - Granted over 6,000 new security clearances in support of mission growth across the NNSA NSE.
  - Co-led the Enduring Organizational Improvement Initiative for the Governance and Management: Risk Management sub-group. The team was recognized by NNSA senior leadership for their efforts to identify safety and security requirements that could be retired permanently or modified to improve efficiency, without increasing risk.

- **Information Technology and Cybersecurity**
  - Executed a series of cybersecurity exercises that focused on reinforcing incident response processes and procedures as well as testing new cybersecurity capabilities for possible future investment.
  - Implemented modernization projects to begin improvements in collaboration and communication, working closely with the Department and element CIOs and IT Managers to move to Windows 10 and Microsoft 365.
  - Completed the recapitalization of NNSA's deployed sensor platform, enhancing deployed monitoring capabilities.

Legacy Contractor Pensions and Settlement Payments

This budget line includes funding for the Requa settlement reached in 2019 as well as a portion of an unfunded pension liability at the Savannah River Site in addition to DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL).

The *Requa* lawsuit involved UC employees of LLNL who retired prior to the Laboratory's transition to a new contractor on October 1, 2007. The retirees had been receiving health insurance through a UC health plan but when the LLNL contract transitioned to LLNS, the employees were offered health insurance through the new LLNL contractor, leading the retirees to file a lawsuit seeking reinstatement into the UC health plan. The parties settled the lawsuit in 2019, and a final judgment was issued in April 2020. NNSA agreed, pursuant to the legacy UC-LLNL Contract, to provide UC a portion of the total costs to settle the lawsuit, over a period of seven years through FY 2026. NNSA's responsibility for FY 2024 is $9,000,000.

Funding is also requested for reimbursement of NNSA's portion of the unfunded liability of the Savannah River Nuclear Solutions pensions plan. The NNSA FY 2024 Request includes up to $43,932,000 for this liability; NNSA's portion is allocated between the Defense Nuclear Nonproliferation and Weapons Activities appropriation accounts.

This budget line also continues to include the Weapons Activities share of the DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL). The annual reimbursement is based on the actuarial valuation report and an annual assessment provided by UC and is covered by the terms described in the contracts. These contracts are paid through the Legacy Contractor Pensions and settlement payments line item.

The Weapons Activities share of these costs in the FY 2024 Budget is $72,458,000 which will be partially funded with prior year balances.

Entry Level Hires
The NNSA supports a variety of programs to help train and recruit the next generation of leaders in managing the nuclear stockpile, nonproliferation, nuclear security, and international security, such as the NNSA Graduate Fellowship Program (NGFP), the Minority Serving Institutions Partnership Program (MSIPP), and, where appropriate, the Presidential Management Fellows (PMF) program. These programs foster the pipeline of qualified professionals who will sustain expertise in these areas through future employment within the NNSA nuclear security enterprise. In FY 2024, the Weapons Activities appropriation projects providing $5,500,000 for NGFP support and development activities.

DOE Working Capital Fund (WCF) Support
NNSA Weapons Activities appropriation projected contribution to the DOE WCF for FY 2024 is $32,994,000. This funding covers certain shared enterprise activities including managing enterprise-wide systems, data, and telecommunications and supporting the integrated acquisition environment. There are differences between NNSA's budget for WCF and the amounts allocated to NNSA in the WCF budget included in Volume 2. These differences will be addressed during execution of the FY 2024 budget.

Weapons Activities
Funding by Program
Comparable

($K)

	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Weapons Activities Appropriation					
Stockpile Management					
B61-12 LEP	**771,664**	**672,019**	**449,850**	**-222,169**	**-33.1%**
W88 ALT 370	**207,157**	**162,057**	**178,823**	**+16,766**	**+10.3%**
W80-4 LEP	**1,080,400**	**1,122,451**	**1,009,929**	**-112,522**	**-10.0%**
W80-4 ALT-SLCM	**10,000**	**20,000**	**0**	**-20,000**	**-100.0%**
W87-1 Modification Program	**691,031**	**680,127**	**1,068,909**	**+388,782**	**+57.2%**
W93 Program	**72,000**	**240,509**	**389,656**	**+149,147**	**+62.0%**
Total, Stockpile Major Modernization	**2,832,252**	**2,897,163**	**3,097,167**	**+200,004**	**+6.9%**
Stockpile Sustainment	**1,180,483**	**1,321,139**	**1,276,578**	**-44,561**	**-3.4%**
Weapons Dismantlement and Disposition	**56,000**	**56,000**	**53,718**	**-2,282**	**-4.1%**
Production Operations	**568,941**	**630,894**	**710,822**	**+79,928**	**+12.7%**
Nuclear Enterprise Assurance	**0**	**48,911**	**66,614**	**+17,703**	**+36.2%**
Total, Stockpile Management	**4,637,676**	**4,954,107**	**5,204,899**	**+250,792**	**+5.1%**
Production Modernization					
Primary Capability Modernization					
Plutonium Modernization					
Los Alamos Plutonium Modernization					
Los Alamos Plutonium Operations	**660,419**	**767,412**	**833,100**	**+65,688**	**+8.6%**
21-D-512, Plutonium Pit Production Project, LANL	**350,000**	**588,234**	**670,000**	**+81,766**	**+13.9%**
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	**27,000**	**30,002**	**30,000**	**-2**	**0%**
07-D-220-04, Transuranic Liquid Waste Facility, LANL	**30,000**	**24,759**	**0**	**-24,759**	**-100.0%**
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	**138,123**	**138,123**	**227,122**	**+88,999**	**+64.4%**
Total, Los Alamos Plutonium Modernization	**1,205,542**	**1,548,530**	**1,760,222**	**+211,692**	**+13.7%**

[a] The FY 2022 amounts are comparable with the FY 2024 proposed structure, which includes the FY 2023 restructure which aligned programmatic construction with the portfolio each project supports and moved Capability Based Investments from Infrastructure & Operations to Production Modernization.

	($K)				
	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Savannah River Plutonium Modernization					
Savannah River Plutonium Operations	**128,000**	**58,300**	**62,764**	**+4,464**	**+7.7%**
21-D-511, Savannah River Plutonium Processing Facility, SRS	**475,000**	**1,200,000**	**858,235**	**-341,765**	**-28.5%**
Total, Savannah River Plutonium Modernization	**603,000**	**1,258,300**	**920,999**	**-337,301**	**-26.8%**
Enterprise Plutonium Support	**107,098**	**88,993**	**87,779**	**-1,214**	**-1.4%**
Total, Plutonium Modernization	**1,915,640**	**2,895,823**	**2,769,000**	**-126,823**	**-4.4%**
High Explosives & Energetics					
High Explosives & Energetics	**68,785**	**101,380**	**93,558**	**-7,822**	**-7.7%**
23-D-516 Energetic Materials Characterization Facility, LANL	**0**	**19,000**	**0**	**-19,000**	**-100.0%**
21-D-510 HE Synthesis, Formulation, and Production, PX	**44,500**	**108,000**	**0**	**-108,000**	**-100%**
15-D-301 HE Science & Engineering Facility, PX	**0**	**20,000**	**101,356**	**+81,356**	**+406.8%**
Total, High Explosives & Energetics	**113,285**	**248,380**	**194,914**	**-53,466**	**-21.5%**
Total, Primary Capability Modernization	**2,028,925**	**3,144,203**	**2,963,914**	**-180,289**	**-5.7%**
Secondary Capability Modernization	**488,097**	**536,363**	**666,914**	**+130,551**	**+24.3%**
18-D-690, Lithium Processing Facility, Y-12	**167,902**	**216,886**	**210,770**	**-6,116**	**-2.8%**
06-D-141, Uranium Processing Facility, Y-12	**600,000**	**362,000**	**760,000**	**+398,000**	**+109.9%**
Total, Secondary Capability Modernization	**1,255,999**	**1,115,249**	**1,637,684**	**+522,435**	**+46.8%**
Tritium and Domestic Uranium Enrichment	**489,017**	**506,649**	**592,992**	**+86,343**	**+17.0%**
18-D-650, Tritium Finishing Facility, SRS	**27,000**	**73,300**	**0**	**-73,300**	**-100.0%**
Total, Tritium and Domestic Uranium Enrichment	**516,017**	**579,949**	**592,992**	**+13,043**	**+2.2%**
Non-Nuclear Capability Modernization					
Non-Nuclear Capability Modernization	**144,563**	**123,084**	**166,990**	**+43,906**	**+35.7%**
22-D-513, Power Sources Capability, SNL	**13,827**	**0**	**37,886**	**+37,886**	**0%**
Total, Non-Nuclear Capability Modernization	**158,390**	**123,084**	**204,876**	**+81,792**	**+66.5%**
Capability Based Investments	**187,566**	**154,220**	**156,462**	**+2,242**	**+1.5%**
Planning for Programmatic Construction (Pre-CD-1)	**10,000**	**0**	**0**	**0**	**0%**
Total, Production Modernization	**4,156,897**	**5,116,705**	**5,555,928**	**+439,223**	**+8.6%**

[a] The FY 2022 amounts are comparable with the FY 2024 proposed structure, which includes the FY 2023 restructure which aligned programmatic construction with the portfolio each project supports and moved Capability Based Investments from Infrastructure & Operations to Production Modernization.

($K)

	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Stockpile Research, Technology, and Engineering					
Assessment Science					
Primary Assessment Technologies	150,000	154,507	160,634	+6,127	+4.0%
Dynamic Materials Properties	130,981	124,366	128,560	+4,194	+3.4%
Advanced Diagnostics	35,989	31,064	35,141	+4,077	+13.1%
Secondary Assessment Technologies	84,000	72,104	74,880	+2,776	+3.8%
Enhanced Capabilities for Subcritical Experiments	215,579	277,225	292,373	+15,148	+5.5%
Hydrodynamic and Subcritical Experiment Execution Support	152,845	142,402	146,163	+3,761	+2.6%
24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS	0	0	80,000	+80,000	+0.0%
17-D-640, U1a, Complex Enhancements Project, NNSS	135,000	53,130	126,570	+73,440	+138.2%
Total, Assessmment Science	904,394	854,798	1,044,321	+189,523	+22.2%
Engineering and Integrated Assessments					
Archiving and Support	45,760	43,950	44,805	+855	+1.9%
Delivery Environments	39,235	37,674	38,388	+714	+1.9%
Weapons Survivability	59,500	93,303	88,368	-4,935	-5.3%
Studies and Assessments	0	5,000	79,924	+74,924	+1498.5%
Aging and Lifetimes	87,260	87,260	59,955	-27,305	-31.3%
Stockpile Responsiveness	50,000	63,742	69,882	+6,140	+9.6%
Advanced Certification and Qualification	60,330	58,104	59,134	+1,030	+1.8%
Total, Engineering and Integrated Assessments	342,085	389,033	440,456	+51,423	+13.2%
Inertial Confinement Fusion	580,000	630,000	601,650	-28,350	-4.5%
Advanced Simulation and Computing	747,012	790,000	782,472	-7,528	-1.0%
Weapon Technology and Manufacturing Maturation	292,630	286,165	327,745	+41,580	+14.5%
Total, Stockpile Research, Technology, and Engineering	2,866,121	2,949,996	3,196,644	+246,648	+8.4%
Academic Programs and Community Support [b]	111,912	111,912	152,271	+40,359	+36.1%

[a] The FY 2022 amounts are comparable with the FY 2024 proposed structure, which includes the FY 2023 restructure which aligned programmatic construction with the portfolio each project supports and moved Capability Based Investments from Infrastructure & Operations to Production Modernization.

[b] Starting in FY 2024, NNSA is proposing to elevate Academic Programs from a congressional control level within Stockpile Research, Technology, and Engineering (SRT&E) to a stand-alone Government Results and Performance Act (GPRA) Unit titled, Academic Programs and Community Support. This change will enable improved program integration, agility, development, and alignment to critical workforce needs. FY 2022 and FY 2023 amounts are comparable with this proposal.

	($K)				
	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Infrastructure and Operations					
Operating					
Operations of Facilities	**1,014,000**	**1,038,000**	**1,053,000**	**+15,000**	**+1.4%**
Safety and Environmental Operations	**165,354**	**162,000**	**139,114**	**-22,886**	**-14.1%**
Maintenance and Repair of Facilities	**700,000**	**651,617**	**718,000**	**+66,383**	**+10.2%**
Recapitalization					
Infrastructure and Safety	**600,000**	**561,663**	**650,012**	**+88,349**	**+15.7%**
Subtotal, Recapitalization	**600,000**	**561,663**	**650,012**	**+88,349**	**+15.7%**
Total, Operating	**2,479,354**	**2,413,280**	**2,560,126**	**+146,846**	**+6.1%**
Construction					
Mission Enabling Construction					
24-D-512, TA-46 Protective Force Facility - Phase 1, LANL	**0**	**0**	**48,500**	**48,500**	**0%**
24-D-511, Plutonium Production Building, LANL	**0**	**0**	**48,500**	**48,500**	**0%**
24-D-510, Analytic Gas Laboratory, PX	**0**	**0**	**35,000**	**35,000**	**0%**
23-D-519 Special Materials Facility, Y-12	**0**	**49,500**	**0**	**-49,500**	**-100.0%**
23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL	**0**	**48,500**	**0**	**-48,500**	**-100.0%**
23-D-517, Electrical Power Capacity Upgrade, LANL	**0**	**24,000**	**75,000**	**+51,000**	**+212.5%**
22-D-514, Digital Infrastructure Capability Expansion, LLNL	**8,000**	**67,300**	**0**	**-67,300**	**-100.0%**
19-D-670, 138kV Power Transmission System Replacement, NNSS	**0**	**0**	**0**	**0**	**0%**
15-D-612, Emergency Operations Center, LLNL	**0**	**0**	**0**	**0**	**0%**
15-D-611, Emergency Operations Center, SNL	**0**	**0**	**0**	**0**	**0%**
Total, Mission Enabling Construction	**8,000**	**189,300**	**207,000**	**17,700**	**+9.4%**
Total, Infrastructure and Operations	**2,487,354**	**2,602,580**	**2,767,126**	**+164,546**	**+6.3%**
Secure Transportation Asset					
Operations and Equipment	**213,704**	**214,367**	**239,008**	**+24,641**	**+11.5%**
Program Direction	**117,060**	**130,070**	**118,056**	**-12,014**	**-9.2%**
Total, Secure Transportation Asset	**330,764**	**344,437**	**357,064**	**+12,627**	**+3.7%**

[a] The FY 2022 amounts are comparable with the FY 2024 proposed structure, which includes the FY 2023 restructure which aligned programmatic construction with the portfolio each project supports and moved Capability Based Investments from Infrastructure & Operations to Production Modernization.

	FY 2022a Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
	($K)				
Defense Nuclear Security					
Operations and Maintenance	**821,090**	**868,172**	**988,756**	**+120,584**	**+13.9%**
Construction	**23,000**	**3,928**	**28,000**	**+24,072**	**+612.8%**
Total, Defense Nuclear Security	**844,090**	**872,100**	**1,016,756**	**+144,656**	**+16.6%**
Information Technology and Cybersecurity	**406,530**	**445,654**	**578,379**	**+132,725**	**+29.8%**
Legacy Contractor Pensions and Settlement Payments	**78,656**	**114,632**	**65,452**	**-49,180**	**-42.9%**
Subtotal, Weapons Activities	**15,920,000**	**17,512,123**	**18,894,519**	**+1,382,396**	**+7.9%**
Use of Prior Year Balances	0	-396,004	-61,572	+334,432	-84.5%
Total, Weapons Activities	**15,920,000**	**17,116,119**	**18,832,947**	**+1,716,828**	**+10.0%**

Weapons Activities
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Weapons Activities Appropriation				
Stockpile Management				
Stockpile Major Modernization				
B61-12 LEP	**120,182**	**11,819**	**0**	**0**
W88 ALT 370	**78,700**	**17,700**	**0**	**0**
W80-4 LEP	**1,009,929**	**966,090**	**808,900**	**768,184**
W80-4 ALT-SLCM	**0**	**0**	**0**	**0**
W87-1 Modification Program	**1,149,000**	**1,116,000**	**1,120,000**	**1,071,000**
W93 Program	**529,181**	**662,827**	**972,454**	**1,118,014**
Future Strategic Warhead	**0**	**0**	**70,000**	**112,000**
Total, Stockpile Major Modernization	**2,886,992**	**2,774,436**	**2,971,354**	**3,069,198**
Stockpile Sustainment	**1,335,706**	**1,313,174**	**1,303,730**	**1,253,304**
Weapons Dismantlement and Disposition	**54,100**	**58,129**	**59,393**	**60,089**
Production Operations	**741,567**	**768,442**	**794,746**	**811,223**
Nuclear Enterprise Assurance	**70,002**	**72,889**	**76,407**	**80,133**
Total, Stockpile Management	**5,088,367**	**4,987,070**	**5,205,630**	**5,273,947**
Production Modernization				
Primary Capability Modernization				
Plutonium Modernization				
Los Alamos Plutonium Modernization				
Los Alamos Plutonium Operations	**845,867**	**898,394**	**927,493**	**1,004,113**
21-D-512, Plutonium Pit Production Project, LANL	**680,141**	**710,000**	**715,500**	**730,000**
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	**34,475**	**2,000**	**0**	**0**
07-D-220-04, Transuranic Liquid Waste Facility, LANL	**0**	**0**	**0**	**0**
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	**77,000**	**21,204**	**0**	**0**
Total, Los Alamos Plutonium Modernization	**1,637,483**	**1,631,598**	**1,642,993**	**1,734,113**

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Savannah River Plutonium Modernization				
Savannah River Plutonium Operations	74,296	112,373	144,654	164,281
21-D-511, Savannah River Plutonium Processing Facility, SRS	1,100,000	1,200,000	1,200,000	1,230,000
Total, Savannah River Plutonium Modernization	1,174,296	1,312,373	1,344,654	1,394,281
Enterprise Plutonium Support	94,744	95,342	95,294	104,323
Total, Plutonium Modernization	2,906,523	3,039,313	3,082,941	3,232,717
High Explosives & Energetics				
High Explosives & Energetics	105,675	128,451	106,632	113,004
28-D-XXX Radiography / Assembly Complex Replacement, LANL	0	0	0	36,946
23-D-516 Energetic Materials Characterization Facility, LANL	0	0	19,000	102,000
21-D-510 HE Synthesis, Formulation, and Production, PX	0	0	38,838	185,865
15-D-301 HE Science & Engineering Facility, PX	0	0	0	0
Total, High Explosives & Energetics	105,675	128,451	164,470	437,815
Total, Primary Capability Modernization	3,012,198	3,167,764	3,247,411	3,670,532
Secondary Capability Modernization	692,653	733,714	765,370	820,874
26-D-XXX, Agile Radiation Case and Component Capability, Y-12	0	50,000	75,000	200,000
18-D-690 Lithium Processing Facility, Y-12	280,000	290,000	285,000	22,613
06-D-141 Uranium Processing Facility, Y-12	550,000	400,000	225,000	57,613
Total, Secondary Capability Modernization	1,522,653	1,473,714	1,350,370	1,101,100
Tritium and Domestic Uranium Enrichment	635,659	656,090	670,553	675,077
18-D-650 Tritium Finishing Facility, SRS	0	0	120,000	200,000
Total, Tritium and Domestic Uranium Enrichment	635,659	656,090	790,553	875,077
Non-Nuclear Capability Modernization				
Non-Nuclear Capability Modernization	141,688	144,559	162,522	163,374
22-D-513, Power Sources Capability, SNL	71,083	73,902	79,824	45,136
Total, Non-Nuclear Capability Modernization	212,771	218,461	242,346	208,510
Capability Based Investments	153,244	154,289	161,519	162,628

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
	($K)			
Warhead Assembly				
Warhead Assembly Operations	**24,000**	**62,500**	**55,000**	**116,366**
Total, Production Modernization	**5,560,525**	**5,732,818**	**5,847,199**	**6,134,213**
Stockpile Research, Technology, and Engineering				
Assessment Science				
Primary Assessment Technologies	**269,296**	**350,436**	**345,838**	**303,975**
Dynamic Materials Properties	**160,982**	**185,743**	**159,562**	**163,515**
Advanced Diagnostics	**36,500**	**33,210**	**33,907**	**34,143**
Secondary Assessment Technologies	**76,581**	**78,273**	**79,917**	**80,473**
Enhanced Capabilities for Subcritical Experiments	**366,798**	**231,718**	**113,156**	**113,926**
Hydrodynamic and Subcritical Experiment Execution Support	**182,173**	**181,963**	**165,413**	**166,761**
24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS	**0**	**0**	**0**	**0**
17-D-640, U1a, Complex Enhancements Project, NNSS	**33,083**	**0**	**0**	**0**
Total, Assessmment Science	**1,125,413**	**1,061,343**	**897,793**	**862,793**
Engineering and Integrated Assessments				
Archiving & Support	**44,875**	**44,819**	**45,874**	**46,227**
Delivery Environments	**38,447**	**38,397**	**39,208**	**39,481**
Weapons Survivability	**97,002**	**98,248**	**93,434**	**65,736**
Studies and Assessments	**85,000**	**125,000**	**85,000**	**85,000**
Aging & Lifetimes	**60,072**	**59,966**	**61,242**	**61,639**
Stockpile Responsiveness	**70,000**	**70,000**	**71,470**	**71,967**
Advanced Certification & Qualification	**59,229**	**59,160**	**60,417**	**60,837**
27-D-XXX, Combined Radiation Effects Survivability Testing, SNL	**0**	**0**	**150,000**	**200,000**
Total, Engineering and Integrated Assessments	**454,625**	**495,590**	**606,645**	**630,887**
Inertial Confinement Fusion	**688,581**	**708,519**	**749,151**	**729,307**
Advanced Simulation and Computing	**863,795**	**880,795**	**884,415**	**894,765**
Weapon Technology and Manufacturing Maturation	**361,489**	**331,379**	**316,707**	**318,736**
Total, Stockpile Research, Technology, and Engineering	**3,493,903**	**3,477,626**	**3,454,711**	**3,436,488**

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Academic Programs and Community Support	**172,764**	**193,860**	**194,863**	**202,426**
Infrastructure and Operations				
Operating				
Operations of Facilities	**1,115,000**	**1,136,000**	**1,181,000**	**1,210,000**
Safety and Environmental Operations	**155,758**	**154,560**	**154,462**	**154,264**
Maintenance and Repair of Facilities	**737,000**	**752,000**	**772,000**	**792,000**
Recapitalization				
Infrastructure and Safety	**786,031**	**796,913**	**848,686**	**838,352**
Subtotal, Recapitalization	**786,031**	**796,913**	**848,686**	**838,352**
Total, Operating	**2,793,789**	**2,839,473**	**2,956,148**	**2,994,616**
Construction				
Mission Enabling Construction				
28-D-XXX, NW Las Vegas New Office Space NNSS	**0**	**0**	**0**	**14,000**
27-D-XXX, National Security Innovation Center Phase 2, LLNL	**0**	**0**	**10,000**	**86,000**
27-D-XXX, Protective Forces Support Facility, LANL	**0**	**0**	**48,700**	**0**
27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL	**0**	**0**	**13,000**	**129,000**
27-D-XXX, Plutonium Engineering Support Building, LANL	**0**	**0**	**48,700**	**0**
27 D- XXX, Maintenance Facility, Y-12	**0**	**0**	**48,700**	**0**
26-D-XXX, National Security Innovation Center, LLNL	**0**	**96,000**	**0**	**0**
26-D-XXX, Plutonium Program Accounting Building, LANL	**0**	**48,700**	**0**	
26-D-XXX, U1a Complex Access Shaft, NNSS	**15,000**	**110,000**	**89,000**	**86,000**
25-D-XXX, Plutonium Mission Safety & Quality Building, LANL	**48,500**	**0**	**0**	**0**
23-D-517, Electrical Power Capacity Upgrade, LANL	**86,000**	**104,000**	**0**	**0**
Total, Mission Enabling Construction	**149,500**	**358,700**	**258,100**	**315,000**
Total, Infrastructure and Operations	**2,943,289**	**3,198,173**	**3,214,248**	**3,309,616**

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
	($K)			
Secure Transportation Asset				
Operations and Equipment	**255,709**	**275,073**	**319,644**	**315,603**
Program Direction	**135,264**	**138,100**	**140,997**	**149,113**
Total, Secure Transportation Asset	**390,973**	**413,173**	**460,641**	**464,716**
Defense Nuclear Security				
Operations and Maintenance	**1,020,469**	**1,025,445**	**1,104,450**	**1,127,885**
Construction	**0**	**0**	**0**	**0**
Total, Defense Nuclear Security	**1,020,469**	**1,025,445**	**1,104,450**	**1,127,885**
Information Technology and Cybersecurity	**664,374**	**726,561**	**763,072**	**758,664**
Legacy Contractor Pensions and Settlement Payments	**56,278**	**64,206**	**40,869**	**39,431**
Subtotal, Weapons Activities	**19,390,942**	**19,818,932**	**20,285,683**	**20,747,386**
Use of Prior Year Balances	**0**	**0**	**0**	**0**
Total, Weapons Activities	**19,390,942**	**19,818,932**	**20,285,683**	**20,747,386**

Research and Development

The Office of Management and Budget (OMB) Circular No A-11, "Preparation, Submission, and Execution of the Budget," requires the reporting of research and development (R&D) data consistent with this requirement, R&D activities funded by NNSA Weapons Activities programs are displayed below.

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Research and Development (R&D)					
Basic				0	0.0%
Applied	3,082,069	3,262,813	3,263,833	1,020	0.0%
Development	662,532	777,348	822,705	45,357	5.8%
Subtotal, R&D	**3,744,601**	**4,040,161**	**4,086,538**	46,377	1.1%
Equipment	640,191	939,075	1,065,503	126,428	13.5%
Construction	177,960	83,513	276,330	192,817	230.9%
Total, R&D	**4,562,752**	**5,062,749**	**5,428,371**	365,622	7.2%

FY 2024 Integrated Priories

The report accompanying the House Appropriations Committee fiscal year (FY) 2023 appropriations bill, H.R. 117-394, reiterated the requirement for an annual report detailing the Integrated Priorities for the Department of Energy's National Nuclear Security Administration's (DOE/NNSA) Weapons Activities for FY 2024.

> *The fiscal year 2021 Act directed the NNSA to provide with its budget request an Integrated Priorities Report (IPR). The report NNSA submitted does not meet the Committee's direction. In light of NNSA's increasing and highly interdependent workload, which requires significant and sustained investments to reconstitute key capabilities and materials, recapitalize infrastructure and construct new facilities, and modernize cyber and physical security, the Committee considers the IPR critical to its oversight role. NNSA is directed to provide an IPR that meets the direction in the fiscal year 2021 Act not later than 15 days after enactment of this Act and with the annual budget request thereafter.*

This section is intended to convey the requested FY 2024 Integrated Priorities information as rapidly as possible. As detailed below, challenges in large construction projects have led to prioritization decisions—mostly in the form of deferring some projects and focusing funding and labor resources on others—that are reflected in many portions of the FY 2024 Budget Request.

The overarching mission for DOE/NNSA's Weapons Activities is to deliver safe, secure, reliable, nuclear warheads that meet military requirements and support an effective nuclear deterrent. Accomplishing this mission requires the capabilities to:

- Maintain the current stockpile by executing annual surveillance, annual assessments, and exchange of limited life components;
- Design and procure or manufacture each warhead component (e.g., pits, high explosives, detonators, secondaries, canned subassemblies, radiation cases, non-nuclear components, safety and security systems);
- Assess whether manufactured components are of "War Reserve" quality;
- Assess warheads against requirements under all stockpile-to-target sequence (STS) conditions;
- Perform research to develop advanced technologies that will meet evolving requirements;
- Safely and securely transport weapons, components, and special materials;

- Develop and maintain a workforce of stockpile experts whose judgment is an essential part of mission execution and foundational to the credibility of the deterrent;
- Defend the nuclear security enterprise against cyber and supply chain attacks; and
- Defend the nuclear security enterprise against physical attacks.

DOE/NNSA prioritizes specific elements of Weapons Activities with regard for the interdependencies across portfolios and across the complex in the current execution year, the programming year, and the outyears. The prioritization of activities in each portfolio reflects a managed risk approach that considers many factors, including staffing challenges.

Emerging requirements with aggressive timelines necessitate rapid deployment of technologies, which can create technology maturation risks in project execution, especially for new capabilities. DOE/NNSA must identify and mitigate risks of potential single point failures in its systems in a timely manner to ensure ongoing work meets deliverable requirements. As risks are identified and sometimes realized, priorities must shift to implement mitigations.

DOE/NNSA also continues to actively manage its carryover balances and has reduced its budget request in recognition of balances available to support FY 2024 work scope.

The FY 2024 President's Budget Request for Weapons Activities reflects an increase of $1.7 billion, or 10.0 percent, which is needed to execute five warhead modernization programs; continue restoring production capability, including the capability to produce 80 plutonium pits per year (ppy) as close to 2030 as possible; continue modernizing infrastructure; and maintain Stockpile Research, Technology, and Engineering capabilities that are used every day to execute all NNSA programs. The FY 2024 request is fully informed by and supports the 2022 Nuclear Posture Review and National Security Strategy and is also aligned with DoD requirements to ensure the U.S. nuclear deterrent continues to be safe, secure, reliable, and effective. The FY 2024 Budget Request focuses on the following Weapons Activities prioritized efforts aligned under a portfolio management structure to ensure that DOE/NNSA has all the required capabilities to design, build, deliver, maintain, and assess a safe, secure, reliable, and militarily effective nuclear stockpile in support of the Nation's integrated deterrent.

- **Support the active stockpile:** The FY 2024 President's Budget Request prioritizes stockpile maintenance activities that, if delayed, would cause operational issues. DOE/NNSA is prioritizing stockpile sustainment activities to execute maintenance, limited life component exchanges (LLCE), minor alterations, surveillance, assessment, surety studies and capability development, and management activities for all enduring weapons systems in the stockpile, including the B61, W76, W78, W80, B83, W87, and W88 Stockpile Systems, as well as Multi-Weapon Systems (MWS). The FY 2024 funding request will be applied to activities including:
  - Surveillance program activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability, performance, and safety.
  - Annual Assessment activities for all weapon systems including the in-depth testing and analysis of systems, subsystems, and components.
  - Execution of Phase 6.4, *Production Engineering,* efforts for W76-1/-2/Mk4B development;
  - Design, development, qualification, and production of weapon surety capabilities;
  - Implementation of enhanced capability shipping configurations;
  - Transition of the B61-12 into stockpile;
  - Hardware procurements for the W87;
  - Product realization development, digital engineering tool development and deployment, multi weapons surveillance activities, and material procurement requirements for MWS;
  - High explosive component development and production;
  - Special material procurement supporting limited life components (LLCs);
  - Full-scale development for Joint Test Assembly (JTA) flight test vehicle development and production;
  - Development and deployment of product realization and digital engineering tools and applications; and
  - Growth and development of the Nuclear Enterprise Assurance subprogram, which was formally established in FY 2023.

The FY 2024 Budget Request includes funding to continue safety and security surveillance activities for the B83 that are required until the weapon is fully dismantled.

- **Execute warhead modernization programs:** The requested funding supports current stockpile modernization activities (five warhead acquisition programs) to meet production schedules. Increased funding requested for FY 2024 reflects resources prioritized for:
  - B61-12 Life Extension Program (LEP): Reduced funding relative to FY 2023 is sufficient to maintain system-level production at Pantex Plant and deliver B61-12 weapons to the Department of Defense (DoD) in support of delivery dates, and to execute aircraft compatibility testing, including with the Air Force B-21 Raider and Dual Capable Aircraft (U.S. and NATO).
  - W88 Alteration (Alt) 370: Reduced funding relative to FY 2023 is sufficient to execute full-scale system-level production in accordance with approved schedules.
  - W80-4 LEP: Requested funding is sufficient to continue with Phase 6.4, *Production Engineering* activities for the W80-4 LEP in support of the Air Force Long Range Stand-Off (LRSO) program, including joint testing for the W80-4 with Air Force LRSO Program.
  - W87-1 Modification Program: Increased funding relative to FY 2023 is required to continue Phase 6.3, *Development Engineering* and advance technology and manufacturing readiness levels, and progress component and sub-system designs in preparation for the system baseline design review. This includes joint testing with Air Force Sentinel and Mk21A programs, including the first environmental W87-1 flight test with Sentinel.
  - W93 Program: A substantial increase in funding relative to FY 2023 is needed to execute Phase 2, *Feasibility Study,* to ascertain and down-select major subsystem designs and components.

- **Reestablish and modernize production infrastructure and capabilities:**
  - **Prioritization:** After the FY 2023 budget request was submitted, NNSA learned that many large construction projects face significant cost and schedule increases due to market conditions (e.g., tight labor market, supply chain delays, and inflation) and internal challenges (e.g., integration with aging infrastructure, site utility limitations, synchronization of multiple site projects and interfacing work fronts, contractor performance, insufficient upfront planning, overly optimistic assumptions in estimates). Given these realities, NNSA has adopted a strategy of focusing resources (funding and labor) on a reduced number of high-priority projects, while decreasing the resources allocated to other projects, which will be delayed relative to previous plans. The FY 2024 budget request reflects this strategy and the difficult prioritization decisions NNSA has made. Funding has been substantially reduced for line-item projects including the Energetic Materials Characterization Facility (EMCF) at LANL, the High Explosives Synthesis, Formulation and Production (HESFP) facility at Pantex, and the Tritium Finishing Facility (TFF) at SRS. FY 2022 carryover and FY 2023 funding will be used to bring the TFF design to 30 percent complete and to execute the site prep subproject before the project is paused. The requested funding for High Explosives and Energetics reflects the decisions to put HESFP and EMCF projects on hold, while prioritizing High Explosive Science and Engineering facility capital equipment purchases, construction, and transition to operations, as well as construction to establish a high explosives production capability at the Naval Surface Warfare Center Indian Head Division (NSWC IHD).

  - **Pit Production:** Projects and activities associated with reestablishing necessary pit production capabilities remain a priority in FY 2024 and beyond. Production Modernization funds the equipment, facilities, and personnel required to reestablish the Nation's capability to produce 80 ppy as close to 2030 as possible. FY 2024 funding will support process development and qualification activities to move toward the first War Reserve (WR) pit at Los Alamos National Laboratories, expected in or before FY 2025, and Plutonium Modernization activities at the Savannah River Site. The Budget Request for FY 2024 continues to incorporate programmatic line-item construction projects into the Production Modernization portfolio, reflecting alignment between project and program work.
    - Resources applied to the Los Alamos Plutonium Operations funding line will support a ramp-up in engineering evaluations and activities supporting the production of the first WR plutonium pit, in concert with increased

equipment purchases/installation activities and the hiring, training, and qualification of additional staff to support the WR pit production ramp-up.

- Increased funding requested for the Los Alamos Plutonium Pit Production Project (LAP4) will support efforts to mature design documentation for the training facility and the 30R equipment subproject, continue the removal of legacy equipment in PF-4, install new production equipment, and support the baselining and start of construction of the west entry control facility.
- Funding requested for the Savannah River Plutonium Processing Facility (SRPPF) will be applied to activities for maturing the design of the main process building, which includes production equipment and gloveboxes, safety systems, facility utilities, and support infrastructure. Other supporting activities will continue to focus on the design of subprojects for utilities/site preparation, the sand filter, administrative buildings, the high-fidelity training and operations center, as well as continued early site work such as removal of old equipment, early procurements of long lead equipment items, and early work on several subprojects.

- **Modernization and production programs for other materials and components:** DOE/NNSA will use the funding requested to implement the program to produce tritium in support of the nuclear weapons stockpile and other national programs; modernize uranium operations, deliver canned subassemblies and components needed to maintain the stockpile, as well as support nonproliferation programs and the U.S. Navy's nuclear propulsion program; maintain production of the Nation's enriched lithium supply; support qualification of high explosives; and modernize production of non-nuclear components required for both the active stockpile and warhead modernization programs. Increased funding for Secondary Capability Modernization reflects planned investments in critical Depleted Uranium modernization projects, uranium modernization projects, and special materials planned investments, as well as unplanned cost increases and emerging, previously unplanned scope.
  - Funding requested for the Uranium Processing Facility (UPF) reflects continued priority given to completing this important project. DOE/NNSA is working diligently to mitigate impacts caused by the delay in the completion of UPF and to identify funding requirements to ensure a stable and predictable funding profile. To this end, NNSA is pursuing a $203M reprogramming to prevent further delays on the project.
  - FY 2024 funds will be used to execute additional component procurements and Tritium Producing Burnable Absorber Rods (TPBAR) assemblies to satisfy increased production requirements and to continue irradiation of 1,792 TPBARs in WBN1 Cycle 19, complete irradiation of 1,104 TPBARs in WBN2 Cycle 5, and commence irradiation of 1,680 TPBARs in WBN2 Cycle 6.
  - Increased funding for Domestic Uranium Enrichment (DUE) will support strategies to accelerate demonstration and deployment of enrichment technologies.
  - Funding for the Lithium Processing Facility supports initial execution of all CD-3A scope in FY 2024, applying lessons on reducing schedule risk associate with such projects. This facility will restore essential capabilities that are currently deficient.

- **Develop and sustain strong science, technology, and engineering efforts to support the stockpile:** The funding Request in FY 2024 supports research, development, technology, and engineering efforts for current and future stockpile enablement, production enablement and modernization, and capability sustainment. Resources support the scientific foundation for science-based stockpile decisions and actions, including the capabilities, tools, and components needed to enable assessment of the active stockpile and certification of warhead modernization programs without nuclear explosive testing. Funding in this area also supports the development of new materials, technologies, and processes to modernize nuclear systems and production complex, as well as several experimental testbed capabilities.
  - Increased funding will support experiments focused on design and production requirements for validation of modernization weapons design and funding the National Plutonium Aging Strategy and maintains support to mission-critical activities at multiple facilities, including JASPER, National Ignition Facility, TA-55 gas gun, and requisite plutonium shots on Z.
  - FY 2024 funding will be applied to Advanced Simulation and Computing priorities of acquiring the first NNSA Exascale computer (El Capitan), maintaining facility upkeep, code modernization, and system recapitalization, and continuing to support increased simulation workloads for the nuclear weapons mission.

- Increased funding for Weapons Technology and Manufacturing Maturation reflects prioritization of technology development for warhead modernization programs.

- **Address gaps in experimental and computational capabilities:** FY 2024 funds requested for the Stockpile Research Technology and Engineering account will support continued implementation of the Enhanced Capabilities for Subcritical Experiments (ECSE) project and preparations for DOE/NNSA's first Exascale high-performance computing system. These two capabilities will enable essential stockpile stewardship activities for many years. Three projects that will provide long-awaited capabilities for subcritical experiments underground in Nevada—Advanced Sources and Detectors (ASD-Scorpius), Z-pinch Experimental Underground System (ZEUS Test Bed), and the U1a Complex Enhancements Project—face cost and schedule challenges similar to those of other major construction projects, for similar reasons. The FY 2024 Request includes substantial increases, relative to FY 2023, for these high-priority projects. The FY 2024 Request also supports investment in key diagnostic and pulsed power driver activities as well as development of high-priority experimental platforms and materials.

- **Hire and retain the workforce necessary to achieve deliverables and address retirements:** Requested funds will be used to recruit, invest in, and nourish a high-performing, diverse, and flexible workforce that can meet the unique policy, technical, and leadership needs of the nuclear security mission today and in the future.
  - The challenges of modernizing the Nation's nuclear stockpile demand a strong and diverse base of expertise and educational opportunities in specialized technical areas that uniquely contribute to nuclear stockpile stewardship.
  - The Academic Programs and a proposed Community Capacity Building Program are designed to support academic programs in science and engineering disciplines of critical importance to the nuclear security enterprise, such as nuclear science, radiochemistry, materials at extreme conditions, high energy density science, advanced manufacturing, and high-performance computing. The Community Capacity Building Program will support underserved communities that are affected by operations in and around NNSA's sites.

- **Conduct operations across the enterprise:** Funding requested will assure schedule and technology alignment, improve efficiency, and accelerate delivery of design and production. Funding will provide engineering and manufacturing labor, quality assurance, and programmatic equipment support for the manufacturing base that enables the individual sites' capability and capacity to sustain DOE/NNSA's production mission.

- **Secure transport of nuclear materials and warheads:** Funding requested for the Secure Transport Asset program prioritizes shipment operations and efforts to modernize and sustain transportation assets, such as the Mobile Guardian Transporter (MGT), and supports training, equipment, and salaries for federal agents. Secure transportation activities must maintain assets to sustain convoy safety and security to support missions based on changing customer needs and current and future threats.

- **Uphold strong proactive maintenance and recapitalization programs:** The FY 2024 funding supports the plans, prioritization, and construction state-of-the-art facilities and infrastructure to support all NNSA programs, with the exception of new complex-construction projects, which are funded by the programs. The FY 2024 Request provides funding for activities to enable plutonium pit production, expand capacity at the Kansas City National Security Campus, and address infrastructure modernization throughout the complex.
  - Resources will also be applied to recapitalization projects to improve the condition and extend the design life of structures, capabilities, and systems to meet program demands; reduce future operating costs by replacing older facilities with new, more efficient facilities; and reduce safety, security, environment, and program risk.

- **Implement physical security systems and measures across the complex:** The FY 2024 Request prioritizes efforts to fill positions in key security program areas and reflects increased security needs associated with known mission growth in weapons programs across the complex, including pit production at LANL, and efforts to support the UPF. Mission growth across the complex continues to drive the need for increased security resources. Security staff must be trained and cleared in advance to meet forecasted schedules.

- **Sustain and improve information technology systems and cybersecurity to meet directives and other requirements:** FY 2024 funds for Information Technology (IT) and Cybersecurity will be used to provide the nuclear security enterprise's workforce with a more modern and secure set of capabilities including unified communication, agile cloud infrastructure, and next-generation collaboration services. Funds will support deployment of emerging technology, leading-edge operational technology, and artificial intelligence/machine learning, as well as continued cyber technology and security upgrades.

Stockpile Management

Overview
The mission for the Stockpile Management program is to maintain a safe, secure, reliable, and effective nuclear weapons stockpile. The Stockpile Management program encompasses five major subprograms that directly support the Nation's nuclear weapons stockpile. In FY 2024, **Stockpile Major Modernization** will continue Phase 6.6 (*Full-Scale Production*) activities for the B61-12 Life Extension Program (LEP) and W88 ALT 370; continue Phase 6.4 (*Production Engineering*) activities for the W80-4 LEP; continue Phase 6.3 (*Development Engineering*) activities for the W87-1 Modification Program; and continue Phase 2 (*Feasibility Study and Design Options)* for the W93 Program. **Stockpile Sustainment** will continue Phase 6.3 activities for the W76-1/2 Mk4B as well as all the other activities necessary to sustain a safe, secure, reliable, and effective stockpile. **Weapons Dismantlement and Disposition (WDD)** will provide safe and secure dismantlement of nuclear weapons and components in accordance with the Nuclear Weapons Stockpile Plan. **Production Operations (PO)** will sustain production-enabling capabilities and capacities, including process improvements and investments focused on increased efficiency of production performance. **Nuclear Enterprise Assurance (NEA)** will prevent, detect, and mitigate potential consequences of subversion, both to the stockpile and to the associated capabilities to design, produce, and test nuclear weapons.

Major Subprogram Overview:
Stockpile Major Modernization extends the lifetime of the Nation's nuclear stockpile while addressing required updates, replacing aging or obsolete components to ensure continued service life, as well as enhancing security and safety features.

Stockpile Sustainment directly executes maintenance, limited life component exchanges, minor alterations, surveillance, assessment, surety studies and capability improvements, and management activities for all enduring weapons systems in the stockpile. The program includes the B61, W76, W78, W80, B83, W87 and W88 Stockpile Systems, as well as Multi-Weapon Systems (MWS).

Weapons Dismantlement and Disposition (WDD) provides weapon dismantlements, safety studies on retired systems, material characterization, legacy component disposition, and the disposal of retired weapon parts. This includes activities for technical analysis needed to dismantle and safely store weapons being removed from the stockpile.

Production Operations (PO) is a multi-weapon system manufacturing-based program that drives individual site production capabilities and capacity for the stockpile sustainment and modernization programs, including limited life component production, weapon assembly, and disassembly operations. Production Operations also provides production equipment maintenance, and maintenance/calibration services for manufacturing operations to meet Department of Defense (DOD) War Reserve requirements. Production Operations scope covers sustainment of labor required for weapon systems capabilities that enable individual weapon production and are not specific to one material stream. Facility major modernization and construction activities are not part of this budget subprogram and are covered in other parts of the Weapons Activities account.

Nuclear Enterprise Assurance (NEA) ensures the Nuclear Security Enterprise (NSE) actively manages subversion risks to the nuclear weapons stockpile and associated design, production, and testing capabilities. Digital technologies introduce new vulnerability characteristics and multiple new susceptible pathways that if compromised can produce unacceptable physical impacts to safety, the environment, weapon performance, and loss of capabilities. Through nuclear weapon digital assurance (NWDA), NEA enables risk-managed adoption of leading-edge technologies to meet emerging military requirements and reduce modernization schedules and costs. NEA maintains a team of multi-disciplinary experts who perform rapid assessments, develop tools and assurance methods, and provide recommended mitigations. Close coordination is maintained across NNSA and other agencies to stay informed of current threats and best practices.

Stockpile Management
Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Stockpile Management					
Stockpile Management					
Stockpile Major Modernization					
B61-12 LEP	771,664	672,019	449,850	-222,169	-33.1%
W88 ALT 370	207,157	162,057	178,823	+16,766	+10.3%
W80-4 LEP	1,080,400	1,122,451	1,009,929	-112,522	-10.0%
W80-4 ALT-SLCM	10,000	20,000	0	(20,000)	-100%
W87-1 Modification Program	691,031	680,127	1,068,909	+388,782	+57.2%
W93 Program	72,000	240,509	389,656	+149,147	+62.0%
Total, Stockpile Major Modernization	**2,832,252**	**2,897,163**	**3,097,167**	**+200,004**	**+6.9%**
Stockpile Sustainment	**1,180,483**	**1,321,139**	**1,276,578**	**-44,561**	**-3.4%**
Weapons Dismantlement and Disposition	**56,000**	**56,000**	**53,718**	**-2,282**	**-4.1%**
Production Operations	**568,941**	**630,894**	**710,822**	**+79,928**	**+12.7%**
Nuclear Enterprise Assurance	**0**	**48,911**	**66,614**	**+17,703**	**+36.2%**
Total, Stockpile Management	**4,637,676**	**4,954,107**	**5,204,899**	**+250,792**	**+5.1%**

Stockpile Management
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Stockpile Management				
Stockpile Major Modernization				
B61-12 LEP	120,182	11,819	0	0
W88 ALT 370	78,700	17,700	0	0
W80-4 LEP	1,009,929	966,090	808,900	768,184
W80-4 ALT-SLCM	0	0	0	0
W87-1 Modification Program	1,149,000	1,116,000	1,120,000	1,071,000
W93 Program	529,181	662,827	972,454	1,118,014
Future Strategic Warhead	0	0	70,000	112,000
Total, Stockpile Major Modernization	**2,886,992**	**2,774,436**	**2,971,354**	**3,069,198**
Stockpile Sustainment	**1,335,706**	**1,313,174**	**1,303,730**	**1,253,304**
Weapons Dismantlement and Disposition	**54,100**	**58,129**	**59,393**	**60,089**
Production Operations	**741,567**	**768,442**	**794,746**	**811,223**
Nuclear Enterprise Assurance	**70,002**	**72,889**	**76,407**	**80,133**
Total, Stockpile Management	**5,088,367**	**4,987,070**	**5,205,630**	**5,273,947**

Stockpile Management
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Stockpile Management	
Stockpile Major Modernization: The change represents an increase in the W88 ALT 370 for risk mitigation, the W87-1 for execution of Phase 6.3, and the W93 ramp-up of Phase 2 activities. These changes are partially offset by a decrease for the B61-12 LEP due to ramp-down in production activities and a decrease in the W80-4 LEP due to completion of some development activities.	**+200,004**
Stockpile Sustainment: The change represents W78 detonator cable production completion and W78 Integrated Surety Architecture (ISA) scope shifting out of the current FYNSP; W80 completion of MTAD qualification activities and surveillance activities; B83 reduced program requirements per the National Security Memorandum; and the W88 ALT 940 project transition from development to initial system-level production. This is partially offset by increases to the B61, W76, W87, and MWS (B61 for B61-12 transition related activities, W76 for Mk4b development activities, W87 for hardware procurements, and MWS for product realization development, digital engineering tool development and deployment, multi-weapon surveillance activities, and material procurement requirements).	**-44,561**
Weapons Dismantlement and Disposition: The change represents a slight ramp-down associated with disposition of retired weapon components.	**-2,282**
Production Operations: The change represents an increase in base capability support for Power Sources and Energetics; support for the Mark Quality Manufacturing Center (MQMC); New Brunswick Laboratory Operations; NNSA Enterprise Capacity Modeling; and continued hiring of critical skilled labor resources to support increase in production activities.	**+79,928**
Nuclear Enterprise Assurance: The change represents the ramp-up of NEA as it grows into an established program dedicated to actively managing subversion risks, both to the nuclear weapons stockpile and to the associated design, production, and testing capabilities.	**+17,703**
Total, Stockpile Management	**+250,792**

Stockpile Management
Stockpile Major Modernization

Overview

The Stockpile Major Modernization program extends the lifetime of the Nation's nuclear stockpile while addressing required updates, replacing aging/obsolete components to ensure continued service life, and enhancing security and safety features. Stockpile Major Modernization is the stockpile management subprogram necessary to address updated DOD requirements for potentially new capabilities or extending the expected life of stockpile systems for an additional 20 to 30 years. NNSA, in conjunction with DOD, executes stockpile modernization following the Phase X/6.X process guidelines, which provide a framework to conduct and manage refurbishment activities for potentially new or existing weapons. Phase 1/6.1 (*Concept Assessment*) should provide sufficient information for the Nuclear Weapons Council (NWC) to authorize Phase 2/6.2 (*Feasibility Study and Design Options*). Follow-on phases include Phase 2A/6.2A (*Design Definition and Cost Study*), Phase 3/6.3 (*Development Engineering*), Phase 4/6.4 (*Production Engineering*), Phase 5/6.5 (*First Production*) and Phase 6/6.6 (*Full-Scale Production*). For the purposes of this justification, the term "refurbishment" refers to all nuclear weapon major alterations and modifications, including Life Extension Programs (LEP).

Stockpile Management
Stockpile Major Modernization

Description

B61-12 LEP

The B61-12 LEP refurbishes, reuses, or replaces all the bomb's nuclear and non-nuclear components to extend the service life of the B61 by at least 20 years and to improve the bomb's safety, effectiveness, and security. This life extension program addresses all age-related issues of the bomb, and enhances its reliability, field maintenance, safety, and use control. With these upgrades and the addition of an Air Force-supplied Tail Kit Assembly, the B61-12 LEP will consolidate and replace three B61 weapon designs: 3, 4, and 7. When fielded, the B61-12 LEP will have greater accuracy provided by the modern tail kit with no overall change in military characteristics. In June 2016, NNSA authorized the program to transition into Phase 6.4. At the gate review in September 2020, with a follow-on memorandum in November 2020, NNSA authorized the program to transition into Phase 6.5 and the Air Force conducted Final Design Review and Acceptance Group (FDRAAG). In FY 2022, NNSA achieved system level FPU at the Pantex Plant. In June of 2022, the Nuclear Weapons Council (NWC) authorized the B61-12 LEP program to enter Phase 6.6. The program completion date is planned for FY 2026, with no new funding planned for FY 2027 or FY 2028.

W88 ALT 370

The W88 ALT 370 Program extends the W88 lifetime by modernizing the arming, fuzing, and firing (AF&F) assembly, improving surety, and incorporating a lightning arrestor connector. It also provides required logistical spares for sustaining the life of the system. During development, the arming and fuzing portion of the AF&F assembly was designed to be forward compatible with Air Force Fuze requirements, maintaining joint capability during production. The maintenance programs for neutron generator (NG) and gas transfer system (GTS) replacement receive funding under the W88 enduring stockpile system. Limited Life Component (LLC) replacement will be performed concurrently with the ALT 370 conversion. In November 2014, the NWC authorized replacement of the Conventional High Explosive (CHE) and associated materials on the W88 coincident with ALT 370 activities, referred to as CHE Refresh. The CHE Refresh scope is included in the W88 ALT 370 Program and leverages existing tests to the maximum extent possible to minimize costs and reduce logistical impacts to the Navy. In February 2017, NNSA authorized the program to transition into Phase 6.4. Phase 6.5 authorization occurred in November 2020, and NNSA completed the reentry body assembly FPU in July 2021. The NWC formally accepted the W88 ALT 370 as a standard stockpile item in December 2021 and authorized entrance to Phase 6.6 in June 2022. The program completion date is planned for FY 2026 with no new funding planned for FY 2027 or FY 2028.

W80-4 LEP

The W80-4 LEP extends the life of the legacy W80 warhead for use in the Air Force Long Range Stand-Off (LRSO) cruise missile. The LRSO is the replacement for the current, aging Air-Launched Cruise Missile (ALCM). The life extension program will integrate the warhead with the replacement missile platform and address warhead component aging concerns as well as military requirements for reliability, service life, field maintenance, and surety. The program established key design requirements for this LEP to include using insensitive high explosives for the primary, enhancing surety, and developing the warhead/missile interface in parallel with the Air Force. In February 2019, the NWC approved the W80-4 LEP transition to Phase 6.3 in support of the Air Force LRSO missile program. Due to delays associated with COVID, staffing and technical issues, the NWC formally approved a warhead FPU shift from FY 2025 to FY 2027 on June 29, 2022. This shift maintains margin between NNSA FPU and Air Force Initial Operational Capability (IOC), providing NNSA high confidence of supporting Air Force LRSO weapon IOC in FY 2030. Phase 6.4 Production Engineering is planned Q2 FY 2023.

W87-1 Modification Program

The W87-1 Modification Program will replace the W78 warhead and support fielding on the Air Force Sentinel, formerly known as Ground Based Strategic Deterrent (GBSD) missile system, between 2031 and 2033. The W78 is one of the oldest warheads in the stockpile and the W87-1 Modification Program provides improvement in warhead security, safety, and use control. The W87-1 Modification Program is based on a modified design of the W87-0 and will be fielded in the Mk21A reentry vehicle. The FPU is planned between 2030 and 2032.

W93 Program

The W93 Program was established to meet requirements set by the DOD to augment Navy forces with a survivable weapon deployable on the Ohio-class and Columbia-class submarines. The W93 program modernization activity uses a joint NNSA-DOD Phase 1-7 acquisition process which encompasses the Life-Cycle Acquisition for new nuclear weapon design, development, production, sustainment, and dismantlement activities. In FY 2022 the W93 program concluded Phase 1 that evaluated warhead architectures and available technologies against potential range of desired attributes, draft military characteristics, and known constraints. In FY 2023, work commenced on Phase 2 to further refine design and production concepts. The program began to conduct programmatic and technical tradeoffs, evaluate courses of action based on refined Military Characteristics, NNSA and DOD requirements, resources, and timelines. FY 2024 Feasibility assessments will not only inform the W93 down select but will also inform DOD's program activities associated with the Mk7 reentry body. The W93 is planned to be deployed on the Mk7 reentry body. The United Kingdom is participating as an observer in the U.S. W93/Mk7 warhead program.

Highlights of the FY 2024 Budget Request

B61-12 LEP

- Execute steady state production of all components.
- Maintain full-scale system-level production at Pantex Plant and deliver B61-12 weapons to the DOD.
- Execute aircraft compatibility testing, including the Air Force B-21 Raider and Dual Capable Aircraft (U.S. and NATO).
- Execute Retrofit Evaluation System Test (REST) surveillance scope for both system and component in-flight and lab environments.

W88 ALT 370

- Execute full-scale system-level production in accordance with approved schedules.
- Execute REST surveillance scope.

W80-4 LEP

- Continue with Phase 6.4 Production Engineering activities for the W80-4 LEP in support of the Air Force LRSO program.
- Continue Component Final Design Reviews.
- Conduct joint testing with Air Force Long Range Stand-Off (LRSO) Program.
- Deliver Aircraft Maintenance and Capability Risk Reduction Asset to LRSO.
- Complete Nuclear Safety Design Information (NSDI) Preliminary Safety Study (PSS).
- Complete the development of the USA Weapon System Safety Rules (WSSR) supporting the Primary Nuclear Airlift Force (PNAF).

W87-1 Modification Program

- Begin component baseline design reviews.
- Conduct qualitative risk identification and impact analysis and mature quantitative risk analysis process.
- Conduct joint testing with Air Force Sentinel (formerly Ground Based Strategic Deterrence) and Mk21A programs, including the first environmental W87-1 flight test with Sentinel.
- Continue Phase 6.3 and advance technology and manufacturing readiness levels, and progress component and sub-system designs in preparation for the system baseline design review.
- Conduct integrated baseline reviews and establish program final performance management baseline.
- Continue component development builds and testing.

W93 Program

- Continue Phase 2 to ascertain and down-select major subsystem designs and components.
- Support the W93 Project Officers Group (POG) structure including subcommittees, working groups, and task teams.
- Establish a Work Breakdown Structure to serve as the basis for the Phase 2A Weapon Design Cost Report (WDCR) for eventual entry into Phase 3.
- Establish Product Realization Teams.
- Assess technology and manufacturing readiness for potential feasible designs.
- Conduct Quality Management Review (QMR) of advanced technologies under consideration for system adoption.
- Transition advance technologies which have been down selected into the W93 program of record.
- Generate NNSA technical documents as part of Phase 2 study and design options.
- Conduct Customer Requirement Review.
- Conduct hydro design and fabrication activities to support an FY 2025 test.
- Coordinate with the UK on their Replacement Warhead.

FY 2025 – FY 2028 Key Milestones

B61-12 LEP

- Execute aircraft integration activities with U.S. Air Force B-21 bomber and Dual Capable Aircraft (FY 2025).
- Complete Retrofit Evaluation System Test (REST) System and component testing (FY 2025).
- Complete B61-12 shipments to the Air Force and achieve Full Operational Capability (FY 2026).
- Complete Pantex Last Production Unit and life of program component overbuilds (FY 2026).
- Complete program closeout FY 2026.

W88 ALT 370

- Complete component (FY 2025) and system-level (FY 2026) production at steady state rates
- Complete W88 ALT 370 system conversions (last production unit) (FY 2026).
- Conduct program closeout activities (FY 2026).
- Execute REST surveillance scope across multiple fiscal years.

W80-4 LEP

- Conduct joint testing with Air Force Long Range Stand-Off (LRSO) Program (FY 2025 – FY 2028).
- Deliver and test final Aircraft Maintenance and Capability (AMAC) (FY 2026).
- Complete Product Definition and Documentation Review (PDDR) (FY 2026).
- Receive Phase 6.5 Authorization (FY 2027).
- Produce First Production Unit (FPU) (FY 2027).
- Final Weapon Development Report (FWDR) (FY 2027).
- Final Development Review and Acceptance Group (FDRAAG) (FY 2027).
- Conduct System and Warhead Production Steady State Gate (FY 2028).
- Receive Phase 6.6 (FY 2028).
- System Production Review (FY 2028).

W87-1 Modification Program

- Conduct Sentinel environmental flight tests with the Mk21A in conjunction with the Air Force (FY 2025 – FY 2026).
- Complete Component Baseline Design Reviews (FY 2025).
- Complete System Baseline Design Review (FY 2026).
- Complete Baseline Cost Report (FY 2026).
- Enter Phase 6.4 (FY 2027).
- Conduct W87-1 Joint Test Assembly (JTA) development flight tests in conjunction with the Air Force (FY 2026 – FY 2027).

W93 Program

- Complete W93 Program Phase 2 (FY 2025).
- Complete Phase 2A (FY 2025/2026) including the Weapon Design and Cost Report (WDCR) (FY 2026).
- Obtain Phase 3 authorization from the NWC (FY 2026).
- Conduct, in coordination with the Navy, initial and early development flight testing through (FY 2026).
- Complete Conceptual Design Review (FY 2027).

Future Strategic Warhead

- Execute the Phase 1 for the Future Strategic Warhead (FSW) culminating in a Phase 2 recommendation briefing to the NWC (FY 2027/FY2028).
- Start Phase 2 (anticipated FY 2029).

FY 2022 Accomplishments

B61-12 LEP

- Achieved First Production Unit on the all-up-round B61-12 at Pantex.
- Achieved Phase 6.6 authorization in June 2022, from the NWC.
- Completed ship level quantities to support DOD ship schedules.
- Completed seven system joint flight tests on PA-200, F-16 Mid-Life Upgrade (MLU), and F-35A aircraft platforms.
- Completed Aircraft Compatibility Control Drawings for the PA-200, F-15E, F-35A, and B-2.
- Completed all remaining system level qualification activities and release design agencies Qualification Engineering Release to enable Pantex B61-12 production to begin.

W88 ALT 370

- Completed the final review of the Design Review and Acceptance Group in October 2021.
- Released the ALT 370 update to the W88 Major Assembly Release in December 2021.
- Released the Final Alt 370 Addendum to the W88 Final Weapon Development Report in December 2021.
- Delivered the initial operational capability quantity of reentry body assemblies to the U.S. Navy in January 2022.
- Executed Commander Evaluation Test 4 in June 2022 and received authorization to enter Phase 6.6 in June 2022.

W80-4 LEP

- Completed System Baseline Design Review (BDR).
- Completed Program Protection Plan (PPP).
- Completed Nuclear Explosive Package (NEP) Certification Plan.
- Completed Draft Nuclear Weapon Subsystem Test Plan (NWSSTP).
- Completed Draft Preliminary Weapon Development Report (required for Phase 6.4 entry).
- Kicked off Baseline Cost Report development in March 2022.
- Kicked off Preliminary Design Review and Acceptance Group in July 2022.
- Conducted joint testing with Air Force Long Range Stand-Off (LRSO) weapon:
  - Delivered FTU0-2 assets.
  - Completed FTU0-02 Firedown Test.
  - Completed ETU-3 for Separation and Control Test.
  - Completed First Powered Flight.

W87-1 Modification Program

- Documented W87-1 component design trades.
- Conducted several life-of-program material procurements.
- Formalized and signed W87-1/Mk21A Memorandum of Understanding with the Air Force.
- Continued coordinated flight test requirements with the Air Force.
- Estimated the cost of the program through the Weapon Design and Cost Report.

W93 Program

- P prepared and submitted program cost estimates.
- Conducted Technology Readiness Assessment for potential technologies for the W93 Program.
- Completed Phase 1 study report and received NWC approval to conclude Phase 1 and commenced Phase 2.
- Obtained and directed Phase 2 FY 2023 activities.

Stockpile Major Modernization

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
B61-12 LEP $672,019,000	**B61-12 LEP $449,850,000**	**B61-12 LEP -$222,169,000**
• Maintain Phase 6.6 component full-scale production. • Execute system level builds at Pantex Plant and B61-12 shipment schedules to DOD. Execute aircraft compatibility testing with bombers and dual capable aircraft (U.S. and NATO), including the Air Force B-21.	• Maintain Phase 6.6 component full-scale production. • Execute system level builds at Pantex Plant and B61-12 shipment schedules to DOD. • Execute aircraft compatibility testing with bombers and dual capable aircraft (U.S. and NATO), including the Air Force B-21.	• The $222.2 million decrease is consistent with the Program Plan and represents a decrease of production activities as some components reach their full build quantities.
W88 ALT 370 $162,057,000	**W88 ALT 370 $178,823,000**	**W88 ALT 370 +$16,766,000**
• Execute Phase 6.6 (Full-Scale Production) in accordance with approved schedules. • Continue coordinating closely with the Navy to ensure a fully integrated schedule of hardware needs and deliveries.	• Execute Phase 6.6 production in accordance with approved schedules. • Execute Retrofit Evaluation System Test (REST) surveillance scope.	• The $16.8 million increase represents funding required to address risk mitigation to Pantex production. Risk mitigation activities support the production schedule developed by NNSA's Pantex Production Issue Resolution Group including additional resources (e.g., production technicians, tooling) at Pantex to meet production requirements and ensure on-time deliveries to the Navy.
W80-4 LEP $1,122,451,000	**W80-4 LEP $1,009,929,000**	**W80-4 LEP -$112,522,000**
• Close out Phase 6.3 (Development Engineering). • Complete Preliminary Design Review and Acceptance Group (PDRAAG). • Complete System Pre-Production Engineering Gate (PPEG). • Begin Phase 6.4 (Production Engineering) activities for the W80-4 in support of the Air Force LRSO Program.	• Continue with Phase 6.4 activities for the W80-4 LEP in support of the Air Force LRSO Program. • Continue Component Final Design Reviews. • Conduct joint testing with Air Force Long Range Stand-Off (LRSO) Program including Missile Development Flight Testing.	• The $112.5 million decrease represents alignment with the program plan to close out Phase 6.3 activities, and support continuation of Phase 6.4 activities, Component Final Design Reviews, and joint testing with Air Force Long Range Stand-Off (LRSO) Program.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
W80-4 ALT-SLCM $20,000,000	**W80-4 ALT-SLCM $0**	**W80-4 ALT-SLCM -$20,000,000**
• Coordinate activities with Navy on potential delivery vehicle/warhead combinations to meet DOD requirements.	• No funding in FY 2024. • The program is canceled based on the 2022 Nuclear Posture Review (NPR).	• The $20.0 million decrease represents no recurring funding in FY 2024 and out years for the program based on the 2022 NPR.
W87-1 Modification Program $680,127,000	**W87-1 Modification Program $1,068,909,000**	**W87-1 Modification Program +$388,782,000**
• Mature program management and program controls. • Advance technology and manufacturing readiness levels. • Conduct qualitative risk identification and impact analysis and mature quantitative risk analysis process. • Transition to oversight of the program with Earned Value Management. • Conduct joint testing with the Air Force Sentinel, formerly known as Global Based Strategic Deterrence (GBSD), and Mk21A program including preparations for the first W87-1 flight test with Sentinel.	• Advance technology and manufacturing readiness levels. • Begin component baseline design reviews. • Conduct joint testing with Air Force Sentinel, and Mk21A programs, including the first environmental W87-1 flight test with Sentinel. • Continue Phase 6.3 and advance technology and manufacturing readiness levels, and progress component and sub-system designs in preparation for the system baseline design review.	• The $388.8 million increase represents funding for the continued execution of Phase 6.3 (Development Engineering). Phase 6.3 scope includes increases in component design, development, and testing at component and system levels including environmental flight tests with the Air Force Sentinel and Mk21A programs.
W93 Program $240,509,000	**W93 Program $389,656,000**	**W93 Program +$149,147,000**
• Commence Phase 2 (Feasibility Study and Design Options) to execute design and decision analysis to down-select the Nuclear Explosive Package (NEP), including conducting Hydro test and modeling/simulations. • Execute non-nuclear component (NNC) and surety architecture design configuration Analysis of Alternatives and continue the Feasibility Study. • Conduct customer requirements exchanges with the Navy and M&Os to begin requirements assignment to lower-level systems and major components.	• Continue Phase 2 activities to execute design decisions analysis. • Execute Hydrodynamic testing and modeling/simulation analysis. • Finalize system architecture with DOD aeroshell and missile interface. • Continue to conduct “phased” customer requirements technical exchanges for system and major subsystems. • Down-select technologies, that have achieved acceptable technology, manufacturability, and qualification readiness levels.	• The $149.1 million increase represents the ramp-up of activities within Phase 2 to include design execution and manufacturability, execute risk mitigation activities, decision analysis leading to down-select the Nuclear Explosive Package (NEP), Hydro testing/modeling/simulations, execution of surety architecture design activities, system integration with Navy/Lockheed Martin Space, begin prototyping and testing of non-nuclear hardware, adoption of down-selected technologies into the POR and begin relevant

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Continue to establish federal program management documents, including a mature Work Breakdown Structure (WBS) to serve as the basis for the Phase 2A (Design Definition and Cost Study) and Weapon Design Cost Report (WDCR) for eventual entry into Phase 3. • Continue to coordinate with the UK on their Replacement Warhead.	• Adopt down-selected technologies into program of record (POR) and begin relevant environments design and testing through the establishment of the Product Realization Teams (PRT). • Coordinate with DOD partners on defining/refining physical and functional interface definition. • Begin building and testing W93 relevant protype Non-Nuclear Component hardware and continue to conduct trade Studies leading to design down-select decisions. Initiate comprehensive system-level Nuclear Explosive Physics assessment of Primary designs to support nuclear system design down-select decisions. • Identify and mitigate program risks utilizing the program's Risk Management Process to enable the program's ability to meet the planned schedule.	environments design/testing through the establishment of PRTs.

Stockpile Management
Stockpile Sustainment

Overview
The Stockpile Sustainment program directly executes maintenance, limited life component exchanges (LLCE), minor alterations, surveillance, assessment, surety studies and capability development, and management activities for all enduring weapons systems in the stockpile. The program includes the B61, W76, W78, W80, B83, W87, and W88 Stockpile Systems, as well as Multi-Weapon Systems (MWS). As required by 50 United States Code (USC) Section 2525, safety, security, and effectiveness assessments are performed to determine whether the systems can continue to be certified without the need for an underground nuclear test.

Current U.S. nuclear weapons and associated delivery systems

Warheads—Strategic Ballistic Missile Platforms					
Type [a]	***Description***	***Carrier***	***Laboratories***	***Mission***	***Military***
W78	Reentry vehicle warhead	Minuteman III Intercontinental Ballistic Missile	LANL/SNL	Surface to surface	Air Force
W87-0	Reentry vehicle warhead	Minuteman III Intercontinental Ballistic Missile	LLNL/SNL	Surface to surface	Air Force
W76-0/1/2	Reentry body warhead	Trident II D5 Strategic Weapon System (Submarine Launched Ballistic Missile)	LANL/SNL	Underwater to surface	Navy
W88	Reentry body warhead	Trident II D5 Strategic Weapon System (Submarine Launched Ballistic Missile)	LANL/SNL	Underwater to surface	Navy
Bombs—Aircraft Platforms					
Type [a]	***Description***	***Carrier***	***Laboratories***	***Mission***	***Military***
B61-3/4	Non-strategic bomb	F-15, F-16, certified NATO aircraft	LANL/SNL	Air to surface	Air Force/ Select NATO forces
B61-7	Strategic bomb	B-2 bomber	LANL/SNL	Air to surface	Air Force
B61-11	Strategic bomb	B-2 bomber	LANL/SNL	Air to surface	Air Force
B83-1	Strategic bomb	B-2 bomber	LLNL/SNL	Air to surface	Air Force
Warheads—Cruise Missile Platforms					
Type [a]	***Description***	***Carrier***	***Laboratories***	***Mission***	***Military***
W80-1	Air-launched cruise missile strategic	B-52 bomber	LLNL/SNL	Air to surface	Air Force

LANL = Los Alamos National Laboratory
LLNL = Lawrence Livermore National Laboratory
NATO = North Atlantic Treaty Organization
SNL = Sandia National Laboratories

[a] The suffix associated with each warhead or bomb type (*e.g.*, "-0/1" for the W76) represents the multiple modifications associated with the respective weapon.

Stockpile Management
Stockpile Sustainment

Description

B61 Stockpile Systems

The B61 gravity bombs are the oldest weapons in the enduring stockpile and are deployed by the Air Force on various aircraft. The B61 family includes five modifications with two distinct categories. The strategic category includes the B61 Modifications -7 and -11. The non-strategic category includes the B61 Modifications -3 and -4, supporting the Nation's extended nuclear commitment. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the B61 gravity bombs.

W76 Stockpile Systems

The W76-0/1/2 are the warheads integrated into the Trident II D5 Strategic Weapon System. It is part of the Submarine-Launched Ballistic Missile (SLBM) force. The W76-0/Mk4, W76-1/Mk4A, and W76-2/Mk4A are completed by NNSA as a Reentry Body Assembly and delivered to DOD. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the W76 warheads.

W78 Stockpile Systems

The W78/ Mk12A re-entry vehicle is deployed on the Minuteman III Intercontinental Ballistic Missile (ICBM). This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the W78 warheads.

W80 Stockpile Systems

The W80 warhead is used in the Air Launched Cruise Missile (ALCM) deployed by the Air Force. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the W80 warheads.

B83 Stockpile Systems

The B83 is an aircraft-delivered, strategic gravity bomb deployed by the Air Force. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities until all B83 gravity bombs are retired and dismantled, pursuant to the 2022 Nuclear Posture Review (NPR).

W87 Stockpile Systems

The W870/Mk21 re-entry vehicle is deployed on the Minuteman III ICBM and will be the first warhead deployed on Sentinel, formerly GBSD. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the W87-0 warheads. It also supports development and qualification activities for Sentinel integration.

W88 Stockpile Systems

The W88 is integrated into the Trident II D5 Strategic Weapon System. It is part of the Submarine-Launched Ballistic Missile (SLBM) force. The W88/Mk5 is completed by NNSA as a Re-entry Body Assembly and delivered to DOD. This program directly executes weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities for the W88 warheads.

Multi-Weapon Systems

Multi-Weapon Systems (MWS) is a multi-weapon, multi-site product-based program that enhances the integration and efficiency of the NNSA's nuclear security enterprise (NSE). The activities within MWS are cross-cutting among sites and/or weapons or cannot be funded by specific weapons programs due to classification restrictions. This program provides multi-weapon products to the NNSA NSE supporting surveillance, reliability, maintenance, product realization, digital engineering, weapons response, nuclear explosive safety, military liaison, integrated surety architecture, and use control for both the current and modernized stockpile.

Major activities within each area

(1) Weapon Maintenance: Includes production of limited-life components (LLCs) including gas transfer systems (GTS), neutron generators (NG), and other designated limited-life components as required by guidance and directive schedules, day-to-day stockpile maintenance and repair activities, production, and delivery of components for each weapon type, refurbishment, and replacement of aging components to sustain stockpile life and rebuilds.

(2) Weapon Surveillance: Includes Joint Test Assembly (JTA) flight test vehicle and ground testbed builds, new material laboratory and flight tests, retrofit evaluation system laboratory and flight tests, stockpile laboratory tests, stockpile flight tests, quality evaluations, special testing, and component and material evaluation to support assessment of the safety, security, and effectiveness of the nuclear weapons stockpile. Data from these tests contributes to the Annual Assessment Reports and the Report on Stockpile Assessments to the President.

(3) Weapon Assessment: Includes activities associated with management of fielded weapon systems. Provides systems and component engineering support, support to planning, resolution, and documentation of significant finding investigations (SFIs) to include assessment of root cause, extent of condition, and impact to system effectiveness or safety. Also includes activities associated with planning, developing, and updating the technical basis for the materials, components, and weapons and performing the weapon assessments. Finally, this includes activities associated with preparation, writing, and coordination of Annual Assessment Reports (AARs) and Weapon Reliability Reports (WRRs), as well as activities needed to assess/resolve system-specific weapon response issues and to provide support to the Nuclear Explosive Safety Study Groups (NESSGs) and the Nuclear Weapon System Surety Groups (NWSSGs) as required. Within MWS, activities in this area include use control studies and assessment, as well as surety capability design, development, qualification, production, and integration for the legacy and modern stockpile.

(4) Development Studies/Capability Improvements: Includes activities associated with improvements in surveillance capabilities, technical basis improvements, weapon specific technology maturation for insertion or replacement, JTA development/refresh, and system/surety studies.

(5) Weapon Program Planning/Support: Includes activities associated with management of fielded weapon systems. Provides systems and component engineering support for planning, issue resolution, and documentation. Within MWS, includes those activities needed to operate, maintain, and develop products, tools, and applications supporting enterprise product realization through an integrated digital environment and activities associated with external production liaison missions, weapon response, nuclear explosive safety, and technical basis.

Highlights of the FY 2024 Budget Request

- Complete development, qualification, production, and delivery of all scheduled Limited Life Components (LLC) for the B61, W76, W78, W80, B83, W87, and W88. LLCs include gas transfer systems (GTS), neutron generators (NG), and alteration kits delivered to sustain the nuclear weapons stockpile.
- Conduct surveillance program activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability, performance, and safety.
- Conduct Annual Assessment activities for all weapon systems including the in-depth testing and analysis of systems, subsystems, and components.
- Analyze, evaluate, and close high priority Significant Finding Investigations (SFI) in accordance with the currently approved plans.
- Continue legacy component builds on legacy equipment for life of program needs.
- Continue transition activities of the B61-12 from the LEP to the stockpile.
- Continue procurement and production of B61-12 GTS second cycle components as risk mitigation to reduce restart costs.
- Field ISA capability for the B61-12.
- Continue B61 PBX 9502 qualification activities.
- Produce B61 Multi-Application Transportation Attachment Devise (MTAD) ISA components.
- Increase activities related to B61-12 transition to stockpile sustainment.
- Conduct full-scale development for the new W76-1 Joint Test Assembly-3 (JTA3) flight test body, an engineering refresh of the existing W76-1 JTA1.

- Development and qualification activities for ALT 939 Integrated Surety Architecture (ISA) implementation on the W76 family of warheads.
- Continue Phase 6.4 of the W76-1/2 Mk4B development and qualification program.
- Complete W76/Mk4B Design Review-2 (combined Product Definition Documentation Review and Final Design Review)
- Begin planning and analysis with the Navy for D5LE2 compatibility assessment for W76-1,2 and W88
- Conduct pre-production activities and development of W78 JTA6R to replace obsolete W78 JTA6 components to support future flight test missions.
- Conduct W78 repair activities.
- Execute ALT 369 surveillance production activities for the W80 program.
- Continue W80 high explosive safety and hydrodynamic testing to support weapon assessment.
- Complete abnormal heating safety test design process.
- Begin Disassembly for Life Extension Program (DisLEP) activities in support of W80-4.
- Implement electrostatic discharge quantitative analysis into B83 weapon response.
- Continue B83 safety surveillance activities.
- Produce W87 ALT 360 GTS.
- Continue integration of W87-0 with the Air Force's Sentinel replacement for the Minuteman III (MMIII) and the Mk21 Fuze.
- Produce W87 Joint Environmental Test Units to support first and follow-on flight tests of the Sentinel missile.
- Support Air Force execution of MMIII to Sentinel transition for W87-0.
- Execute W87-0 NG retrofit repairs and rebuild activities.
- Develop and produce WR JTA hardware, including firing set assemblies (FSA) and canned subassembly (CSA) for the W87-0.
- Execute First Production Unit of the -05 Firing Set Assembly for the W87.
- Complete qualification of W88 ALT 940 ISA and meet initial operational capability.
- Produce W88 ALT 940 ISA components.
- Produce GTS and NG for W88 ALT 370 to support stockpile sustainment.
- Conduct procurement and installation of the Safeguard Transporter (SGT) Capability Retrofit (SCR) as the ISA application for transportation SGT solutions.
- Execute ISA logistics hub operations for DOE/NNSA transportation in accordance with ISA requirements and schedules.
- Conduct stockpile sustainment activities providing products, components, and/or services to execute multi-weapon surveillance, weapons reliability reporting to DOD, weapon logistics and accountability, special materials, and stockpile planning.
- Develop and deploy new product realization tools and applications to support stockpile sustainment and modernization activities within a digital engineering and model-based system engineering integrated environment.
- Support cybersecurity requirements for digital engineering tools and applications.
- Provide multi-system weapon response, nuclear explosive safety, and external production resources ensuring safe nuclear explosive operations.
- Continue implementation of multi-system ISA requirements across the stockpile, specifically with progress toward various IOC dates for Enhanced Capability Shipping Configurations (ECSE).
- Conduct multi-system use control system studies and assessments.
- Design, develop, qualify, and produce surety capabilities aligned with weapon schedules and enduring stockpile refresh opportunities.
- Complete engineering support to bring a third centrifuge at the Weapons Evaluation Test Laboratory (WETL) Pantex online.
- Provide engineering support for Tonopah Test Range (Nevada) radar recapitalization.

FY 2025 – FY 2028 Key Milestones

- Complete development, qualification, production, and delivery of all scheduled Limited Life Components (LLC) for the B61, W76, W78, W80, B83, W87, and W88. LLCs include gas transfer systems (GTS), neutron generators (NG), and alteration kits delivered to sustain the nuclear weapons stockpile.

- Conduct surveillance program activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability, performance, and safety.
- Conduct Annual Assessment activities for all weapon systems including the in-depth testing and analysis of systems, subsystems, and components.
- Analyze, evaluate, and close high priority Significant Finding Investigations (SFI) in accordance with the currently approved plans.
- Complete legacy component builds on legacy equipment for life of program needs.
- Integrate the B61-12 into stockpile sustainment to include LLC production, surveillance, and annual assessment activities (FY 2025).
- Complete B-21 aircraft nuclear compatibility certifications for the B61 (FY 2028).
- Begin full rate production of B61-12 GTS second cycle components (FY 2026).
- Begin production of high explosive (PBX 9502) components to support B61-12 rebuilds (FY 2026).
- Finish B61 production of ISA/MTAD Subsystem (FY 2025).
- Complete the W76-1 JTA3 Baseline Design Review (FY 2025).
- Complete W76 ALT 939 Final Design Review (FY 2025).
- Receive W76/Mk4B Phase 6.5 authorization (FY 2025) to achieve First Production Unit (FPU) (FY 2026).
- Receive W76/Mk4B Phase 6.6 authorization (FY 2026).
- Achieve W76 ALT 939 FPU (FY 2027).
- Execute W76 JTA3 Final Design Review (FY 2027).
- Continue W78 repairs.
- Achieve two development JTA6R test flights for the W78.
- Achieve FPU of the -108 Firing Set Assembly for the W87-0.
- Execute ALT 369 surveillance replacement builds for the W80 annually (FY 2025 - FY 2028).
- Restart ISA/MTAD-development activities for the W80 (FY 2027).
- Conduct W80 disassembly activities for conversion to W80-4 (FY2028).
- Continue B83 safety surveillance activities.
- Achieve JTA1-3 and JTA4b flight test vehicle qualification Sentinel flights for W87-0 (starting FY 2026).
- Achieve W87 Operations Weapon System Article (OWSA) on Sentinel (FY 2028).
- Complete 1E38 Detonator Lot 3811 (FY 2025) for the W88.Transition SGT Capability Retrofit (SCR) sustainment to MWS (FY 2024) and complete SCR conversions (FY 2026).
- Across Multiple Fiscal Years:
  - Deliver MWS use control systems studies and capabilities.
  - Deliver MWS Weapon Reliability Report to DOD annually.
  - Deliver MWS digital capabilities that improve the product realization processes across the nuclear security enterprise.
  - Complete MWS engineering support for Tonopah Test Range radar recapitalization.

FY 2022 Accomplishments

- Delivered all scheduled LLCs for the B61, W76, W78, W80, B83, W87, and W88.
- Conducted surveillance activities for all weapon systems using data collection from flight tests, laboratory tests, and component evaluations to assess stockpile reliability without nuclear testing which culminated in completion of all Annual Assessment Reports and generation of Laboratory Director Letters to the President.
- Reaccepted B61 JTA components by referencing newly developed reacceptance criteria.
- Completed B61-11 Cable Pull Down (CPD) technical basis assessment.
- Continued planning and early development for the W76 JTA 3 (JTA1 refresh). Completed W76-1 JTA3 Conceptual Design Review.
- Implemented tailored analysis of alternatives study to replace H1333B shipping container for W76 warheads with H1514D container.
- Conducted W78 repairs.
- Continued development of the W78 JTA6R (JTA6 Refresh).
- Completed FY 2022 W80 ALT 369 deliveries to the Air Force.

- Executed three W80 ALCM JTA8 and one JTA3CR flight tests.
- Restarted B83 Nuclear Explosive Operations at Pantex.
- Completed B83 Stockpile Laboratory Test.
- Completed B83 Joint Test Assembly (JTA 342).
- Conducted W87 integration activities to support MK21 replacement fuse and Sentinel including JETU, JTA4a, and JTA4b flight test vehicle development.
- Conducted W87 repairs and rebuilds.
- Continued -107 FSA production for the W87.
- Continued -108 FSA development including completion of the final design review for the W87.
- Completed final design review for CSA sim for the W87.
- Completed development of W88 ALT 940 ISA transportation surety solution.
- Met FPU for W88 ALT 940 Mechanical Module and Door Module.
- Delivered W88 H1514C containers to the DOE/NNSA and DOD.
- Delivered the Weapon Reliability Report to the DOD.
- Completed required WETL test requirements.
- Delivered Code Management System (CMS) Controllers, Field Testers, and support equipment to DOD.
- Completed multi-system use control system studies and assessments.
- Delivered surety capabilities aligned with weapon schedules and enduring stockpile refresh opportunities.
- Deployed product realization tools and applications to support stockpile sustainment and modernization activities.

Stockpile Sustainment

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Stockpile Sustainment $1,321,139,000	**Stockpile Sustainment $1,276,578,000**	**Stockpile Sustainment -$44,561,000**
Overall: • Execute weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities. • Produce and conduct LLCE operations. • Conduct surveillance activities, including D&I, system-level laboratory tests, joint flight tests, component and material evaluations, and assessment. • Conduct weapon assessment activities necessary to complete WRRs and AARs, to include analyses of laboratory testing and SFIs, as required. • Implement integrated surety architecture (ISA) capabilities and conduct multi-system implementation studies. • Develop, qualify, and produce weapon surety capabilities. • Execute activities associated with management of fielded weapon systems. • Provide systems and component engineering support for planning, resolution, and documentation.	Overall: • Execute weapon maintenance, limited life component exchanges, minor alterations, surveillance, assessment, capability development and management activities. • Produce and conduct LLCE operations. • Conduct surveillance activities, including D&I, system-level laboratory tests, joint flight tests, component and material evaluations, and assessment. • Conduct weapon assessment activities necessary to complete WRRs and AARs, to include analyses of laboratory testing and SFIs, as required. • Implement integrated surety architecture (ISA) capabilities and conduct multi-system implementation studies. • Develop, qualify, and produce weapon surety capabilities. • Execute activities associated with management of fielded weapon systems. • Provide systems and component engineering support for planning, resolution, and documentation.	Overall: • The $44.6 million decrease represents W78 completion of detonator cable production and W78 Integrated Surety Architecture (ISA) scope shifting out of the current FYNSP; W80 completion of MTAD qualification activities and surveillance activities; B83 reduced program requirements per the National Security Memorandum-9; and the W88 ALT 940 project transition from development to initial system-level production. This is partially offset by increases to the B61, W76, W87, and MWS (B61 for B61-12 transition related activities, W76 for development activities, W87 for hardware procurements, and MWS for product realization development, digital engineering tool development and deployment, multi weapons surveillance activities, and material procurement requirements).
B61 Stockpile Systems $130,664,000	*B61 Stockpile Systems $132,930,000*	*B61 Stockpile Systems +$2,226,000*
• Begin sustainment activities of B61-12 to include system management, annual assessment, joint test assembly (JTA) development and procurement, canned sub-	• Continue sustainment activities of B61-12 to include system management, annual assessment, JTA development and	• The $2.2 million increase represents the continued ramp up of B61-12 transition related activities, completion of MTAD qualification activities and transition into production

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
assembly (CSA) retrofit evaluation system test (REST) surveillance, and technical basis development. • Execute and analyze a B61-11 cable pull down and hydrodynamic test to support weapon assessment. • Execute high explosive qualification and development activities to support B61-12 rebuild schedules. • Complete qualification activities to support ISA requirements.	procurement, CSA procurement, REST surveillance, and technical basis development. • Continue procurement and production of B61-12 GTS second cycle components as risk mitigation to reduce restart costs. • Continue production activities to support MTAD subsystem ISA requirements and B61-12 ISA implementation.	activities, and a reduction of PBX 9502 qualification activities.
W76 Stockpile Systems $190,577,000	*W76 Stockpile Systems $205,309,000*	*W76 Stockpile Systems +$14,732,000*
• Conduct joint development and qualification activities with the Navy on the Mk4B for the W76-1 and W76-2 systems. Development and qualification activities includes warhead level ground testing and analysis, component qualification testing and analysis, execution of Phase 6.3 reviews, and planning for authorization of Mk4B nuclear explosive operations at Pantex for warhead conversion from Mk4A to Mk4B configuration for warhead FPU and quantity production. • Continue full program execution for development and qualification of W76-1 JTA3 to ensure on time FPU prior to JTA1 end of life. • Continue ALT 939 development and pre-production activities to support ISA implementation on the W76-1 and W76-2 systems.	• Continue joint development and qualification activities with the Navy on the Mk4B retrofit for the W76-1 and W76-2 systems. Development and qualification activities includes warhead level ground testing and analysis, component qualification testing and analysis, execution of Phase 6.4 reviews, and planning for authorization of Mk4B nuclear explosive operations at Pantex for warhead conversion from Mk4A to Mk4B configuration for warhead FPU and quantity production. • Continue full program execution for development and qualification of W76-1 JTA3 to ensure on time FPU prior to JTA1 end of life. • Continue ALT 939 development and pre-production activities for ISA implementation on the W76-1 and W76-2 systems. • Begin D5LE2 missile platform compatibility planning activities with the Navy.	• The $14.7 million increase represents W76/Mk4B development, JTA3 development, and ALT 939 enhanced shipping configuration development.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
W78 Stockpile Systems $140,209,000	*W78 Stockpile Systems $110,409,000*	*W78 Stockpile Systems -$29,800,000*
• Conduct JTA6R technology development including qualification testing and component production. • Conduct W78 repair activities. • Complete detonator production. Support Air Force execution of MMIII to Sentinel transition. • Conduct GTS production to support LLCE deliveries.	• Continue JTA6R technology development including joint DOD-DOE qualification testing. • Continue W78 repair activities. • Engage in pre-transition activities to support the Air Force execution of MMIII to Sentinel. • Continue to conduct GTS production activities to support LLCE deliveries.	• The $29.8 million decrease represents completion of detonator cable production and Integrated Surety Architecture (ISA) scope shifting out of the current FYNSP.
W80 Stockpile Systems $98,318,000	*W80 Stockpile Systems $69,285,000*	*W80 Stockpile Systems -$29,033,000*
• Conduct W80 ALT 369 surveillance replacement builds. • Complete re-qualification activities and build JTA3. • Execute additional JTA8 build to support flight test backup. • Continue W80-1 disassembly preparation activities for conversion to W80-4. • Continue high explosive safety and hydrodynamic testing activities to support weapon assessment. • Preliminary studies to support abnormal heating safety test. • Complete qualification activities to support ISA requirements.	• Conduct W80 ALT 369 surveillance replacement builds. • Continue W80-1 disassembly preparation activities for conversion to W80-4. • Continue high explosive safety and hydrodynamic testing activities to support weapon assessment. • Complete abnormal heating safety test design process. • Execute Pit Surveillance Activities for W80-1. • Begin production activities to support MTAD sub-system ISA requirements.	• The $29.0 million decrease represents the completion of MTAD qualification activities and schedule rebaseline for ECSC activities with FY 2027 restart. Surveillance JTA build-ahead activities completed in FY2023.
B83 Stockpile Systems $58,930,000	*B83 Stockpile Systems $30,877,000*	*B83 Stockpile Systems -$28,053,000*
• Conduct surveillance activities, including disassembly and inspections (D&Is), system-level laboratory tests, joint flight tests, CMEs, and assessment. • Complete the abnormal thermal safety test.	• Conduct safety surveillance activities, including D&Is, and assessments. • Implement electrostatic discharge quantitative analysis into B83 weapon response.	• The $28.1 million decrease represents updated program requirements reflected in the NSM-9.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Execute electrostatic discharge quantitative analysis to support weapon response and safe handling operations.		
W87 Stockpile Systems $124,541,000	*W87 Stockpile Systems $125,470,000*	*W87 Stockpile Systems +$929,000*
• Conduct GTS production to support LLCE deliveries and hedge. • Execute W87-0 NG retrofit repairs and rebuild activities. • Conduct -108 firing set development and -107 firing set production activities for out-year stockpile rebuilds. • Support Sentinel qualification activities with the DOD including test planning, flight test vehicles development, and supporting stockpile hardware planning. • Support integration the integration activities associated with Mk21 fuze. • Produce WR and joint test assembly components including canned subassemblies (CSA) Simulator (Sim).	• Continue to conduct GTS production activities to support LLCE deliveries and hedge. • Continue activities related to W87-0 NG retrofit repairs and rebuilds. • Continue activities related to -108 firing set development and -107 firing set production for out-year stockpile rebuilds. • Support Sentinel qualification activities with the DOD including joint testing, flight test vehicles development and stockpile hardware planning. • Produce Joint Environmental Test Units to support first Sentinel flight. • Continue to support integration activities associated with the Mk21 replacement fuze. • Continue to produce WR and joint test assembly components including canned subassemblies (CSA) Simulator (Sim).	• The $929 thousand increase represents hardware procurements and production to support rebuilds, repairs, and Sentinel integration; production of JTA components including canned subassembly (CSA) simulator (Sim); and MMIII to Sentinel warhead qualification and transition activities.
W88 Stockpile Systems $139,934,000	*W88 Stockpile Systems $120,364,000*	*W88 Stockpile Systems -$19,570,000*
• Produce ALT 940 ISA system and associated components. • Complete system level qualification activities for SCR ISA transportation and continue production activities.	• Continue production of ALT 940 ISA system and associated components. • Begin D5LE2 platform compatibility planning activities with the Navy.	• The $19.6 million decrease represents the ALT 940 project transition from development to initial system-level production and the transition of Safeguard Transport Compatibility Retrofit to MWS for long-term operations and sustainment.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Multi-Weapon Systems $437,966,000	*Multi-Weapon Systems $481,934,000*	*Multi-Weapon Systems +$43,968,000*
• Conduct use control capability development, equipment procurements and studies supporting LEP FPUs, the enduring stockpile, and external deliverables. • Operate and maintain the ISA logistics hub as a cross-cutting function across all ISA enabled systems. • Procure and manage special material inventories supporting LLCs. • Operate and maintain Product Realization Integrated Digital Enterprise (PRIDE) systems to include design, product as-built, surveillance, and dismantlement information in support of the Stockpile Management mission from design through dismantlement. • Develop and deploy new product realization tools and applications to support stockpile sustainment and modernization activities within a digital engineering and model-based system engineering integrated environment. • Support cybersecurity requirements for digital engineering tools and applications. • Conduct use control training and capability integration with DOD customers. • Execute complex-wide studies and multi-weapon activities that analyze the comprehensive security risk and consequence analysis of nuclear weapon systems against specific threats. • Design, develop, produce, and maintain multi-weapon handling and test gear supporting weapon logistics.	• Continue use control capability development, equipment procurement, and studies supporting LEPs the enduring stockpile, and external deliverables. • Continue to operate and maintain the ISA logistics hub as a cross-cutting function. • Procure and manage special material inventories supporting LLCs. • Continue to procure and manage special material inventories supporting LLCs. • Continue to operate PRIDE systems. • Continue development and deployment of new products, tools, and applications to maintain support of stockpile sustainment and modernization activities. • Continue support for cybersecurity requirements for digital of engineering tools and applications. • Conduct use control training and capability integration with DOD customers. • Continue executing complex-wide studies on complex-wide studies and multi-weapon activities that analyze the comprehensive security risk and consequence analysis. • Continue design, development, production and maintenance of multi-weapons handling and test gear supporting weapon logistics. • Continue to perform production and maintenance of test and handling gear, spare parts for DOD, and containers. • Coordinate and manage LLC delivery and schedules with DOD.	• The $44.0 million increase includes development and production of use control capabilities; material procurement requirements to support LLCs for stockpile sustainment and modernization; increased multi-weapon surveillance activities; development and deployment of improved product realization tools and applications; modernizing and deploying digital engineering tools to meet cybersecurity requirements; and development of engineering applications and architectures.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Perform production and maintenance of test and handling gear, spare parts for DOD, and containers. • Coordinate and manage LLC delivery and schedules with DOD. • Maintain storage capacity and provide safe, secure, and compliant storage of SNM at the Pantex Plant, and conduct required SNM surveillance activities supporting the stockpile assessment. • Conduct multi-system weapon response and conduct nuclear explosive safety studies for un-interrupted operations at the Pantex Plant. • Conduct multi-weapon surveillance activities and tester development. • Deliver the Weapon Reliability Report (WRR) to DOD annually. • Respond to DOD Unsatisfactory Reports (URs) in response to potential issues with the stockpile. • Provide DOD training on weapons maintenance activities in the field.	• Continue maintaining storage capacity and providing a safe, secure, and compliant storage of SNM at the Pantex Plant, and conduct required SNM surveillance activities supporting the stockpile assessment. • Maintain multi-system weapon response and nuclear explosive safety studies for un-interrupted operations at the Pantex Plant. • Continue multi-weapon surveillance activities and tester development, responding to DOD URs, and DOD training on weapons maintenance. • Deliver the Weapon Reliability Report (WRR) to DOD annually. • Continue to respond to DOD Unsatisfactory Reports (URs) in response to potential issues with the stockpile. • Continue to provide DOD training on weapons maintenance activities in the field.	

Stockpile Management
Weapons Dismantlement and Disposition

Overview
The Weapons Dismantlement and Disposition (WDD) program provides weapon dismantlements, safety studies on retired systems, material characterization, legacy component disposition, and the disposal of retired weapon parts. It includes activities for technical analysis needed to dismantle and safely store weapons being removed from the stockpile.

Stockpile Management
Weapons Dismantlement and Disposition

Description

Weapons Dismantlement and Disposition (WDD) is a critical element of NNSA's integrated effort to transform the enterprise and the stockpile. Specific activities include weapons disassembly, recycling of material and hardware for LEPs, disposition of retired warhead system components, and ensuring components are available for safety testing. Other supporting activities specific to retired warheads include conducting hazard assessments, issuing safety analysis reports, conducting laboratory and production plant safety studies, and declassification and sanitization of component parts. WDD relies on several enabling programs to complete its mission, such as the Office of Stockpile Production Integration for shipping, receiving, and equipment maintenance; Infrastructure and Operations for infrastructure sustainment and containers; and the Office of Secure Transportation for the movement of weapons and weapon components.

WDD focuses on the safe and secure dismantlement of excess nuclear weapons and components. The WDD program has four major activities:

(1) **Disassembly** – WDD enables the dismantlement of weapons and canned subassemblies and is a significant supplier of material for future nuclear weapons production and Naval Reactors.
(2) **Component Disposition** – WDD ensures waste streams are identified to allow for the permanent disposition of weapon components.
(3) **Retired Systems Management** – WDD enables safety studies that ensure weapons in the stockpile awaiting dismantlement remain safe while in DOD custody.
(4) **Component Characterization** – WDD ensures that all potential hazards contained in weapon components are characterized to allow the weapons complex to safely work with individual weapon components.

Highlights of the FY 2024 Budget Request

- Execute a weapon dismantlement program consistent with the priorities of the LEPs, stockpile, and Naval Reactors.
- Execute annual activities as stated in the Production and Planning Directive.
- Provide enriched uranium, lithium, and components to the LEPs and external customers.
- Perform legacy component disposition activities.

FY 2025 – FY 2028 Key Milestones

- Across Multiple Fiscal Years:
  - Conduct dismantlement activities consistent with the annual Nuclear Weapons Stockpile Memorandum.
  - Reduce the size of legacy disposition inventories at each site.
  - Eliminate excess power supplies from Pantex inventories.
  - Develop processes and procure equipment to support dismantlement of special CSAs.

FY 2022 Accomplishments

- Met stockpile and naval reactor requirements through prioritized weapon and component dismantlement schedules.
- Maintained focus on the Pantex FY 2022 dismantlement program of record.
- Dispositioned weapon program components, keeping legacy piles from growing.
- Managed dismantlement system safety concerns on time.
- Conducted component characterization of hazards on time with no impact to worker safety.

Weapons Dismantlement and Disposition

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Weapons Dismantlement and Disposition (WDD) $56,000,000	**Weapons Dismantlement and Disposition (WDD) $53,718,000**	**Weapons Dismantlement and Disposition (WDD) -$2,282,000**
• Continue safe and secure dismantlement of nuclear weapons and components in excess of national security requirements. • Recycle material and components from dismantled units required for LEPs, the stockpile, and other customers. • Continue effort at minimal levels to decrease Legacy component inventories to make space available for incoming LEP material.	• Continue safe and secure dismantlement of nuclear weapons and components in excess of national security requirements. • Recycle material and components from dismantlement units required for LEPs, the stockpile, and other customers. • Continue effort at increased levels to decrease legacy component inventories to make space available for incoming LEP materials.	• The $2.3 million decrease represents a slight ramp-down associated with dismantlement of components.

Stockpile Management
Production Operations

Overview

Productions Operations is a multi-weapon system manufacturing-based program that drives individual site production capabilities and capacity for the stockpile sustainment and modernization programs, including limited life component production and weapon assembly and disassembly operations. Production Operations also provides production equipment maintenance and calibration services for manufacturing operations to meet DOD War Reserve requirements. Production Operations scope covers sustainment of labor required for weapon systems capabilities that enable individual weapon production and are not specific to one material stream. Facility major modernization and construction activities are not part of this budget subprogram and are covered in other parts of the Weapons Activities account.

Production Operations:

Provides the base manufacturing workforce capabilities (e.g., engineering, manufacturing, quality assurance) and capacity for Major Modernization and enduring stockpile production, weapon assembly, weapon disassembly required to meet NNSA schedules and meet DOD delivery schedules.

Supports the development, qualification, and production of Neutron Generator Assemblies (NGA) shippable items and shelf-life units; in addition, manufactures detonators and detonator cable assemblies.

Expands engineering and quality assurance processes responsive to increased non-nuclear component production requirements.

Stockpile Management
Production Operations

Description

Production Operations provides a multifaceted, skilled labor force, focusing on engineering and manufacturing labor, quality assurance, and programmatic equipment support for the manufacturing base that enables the individual site capability and capacity to sustain NNSA's production mission. Production Operations also refreshes and replaces production capabilities and supports programmatic equipment maintenance to improve efficiency and ensure manufacturing operations meet future DOD requirements. Production Operations requires close coordination with several NNSA Offices to ensure the correct capabilities are in place on time to support stockpile demands.

Production Operations major activities include the following:

- **Engineering & Integration** – Activities associated with the Process and Documentation for the development and production of components.
- **Supplier, Shipping, and Material Management** – Activities associated with the support for vendors, packaging, shipping, transportation, and site logistics and storage.
- **Production Equipment Maintenance** – Activities associated with corrective and preventative maintenance of programmatic equipment.
- **Manufacturing Capability Sustainment** – Activities that enable the design, development, and production of components.
- **Equipment and Material Procurement** – Activities associated with the purchasing of equipment & material, and SNM Accountability and Control.
- **Program Management** – Activities required to support, manage, control, and report on overall program.
- **Modeling & Analysis** – Activities associated with site commodity/capacity analysis to support Defense Programs demand excursions and/or course of actions.
- **New Brunswick Laboratory** – Activities that support the storage, packing, shipping, and routine maintenance of Certified Reference Materials.

Highlights of the FY 2024 Budget Request

- Continue support for the Neutron Generator Enterprise and detonator production activities.
- Continue support for production equipment maintenance to ensure mission deliverables are met for the Sustainment, WDD, and Major Modernization programs.
- Hire critical skilled labor resources to support increase in production activities and address significant attrition across the enterprise.
- Augment support for SNL Power Sources and Energetics base capability.
- Increase base capability support for the non-nuclear component focused MQMC.
- Continue LANL support for the KCNSC expansion and equipment relocation.
- Provide support for equipment maintenance to ensure mission deliverables are met for the Sustainment, WDD, and Major Modernization programs.
- Complete deployment of initial Enterprise Capacity Analysis capability.

FY 2025 – FY 2028 Key Milestones

- Increase critical skilled labor and address attrition to maintain Stockpile Major Modernization scope and schedules in FY 2025 – FY 2026.
- Continue support of production equipment maintenance in FY 2025 – FY 2028.
- Support detonator production at LANL for 3-4 LEPs, W88 Stockpile System, W78 JTA, and Alt activities for multi-weapons in FY 2025 – FY2028.
- Maintain critical Neutron Generator Enterprise in FY 2025 – FY 2028 to ensure production for an average of ~600 units per year.

FY 2022 Accomplishments

- Sustained labor base that spans multiple programs to meet current stockpile deliverables and NNSA's production mission.
- Maintained Critical Production Process Equipment at approximately 98% availability.
- Completed calibration services of over 1,300 critical equipment calibrations on-time in support of production activities.
- Supported approximately 1,100 LLNL Engineering Authorizations (EA), 13 NSE EAs, and 361 PRT meetings.
- Completed over 1,500 War Reserve (WR) Products within the Detonation Production Activities.
- Deployed and executed CNS Y-12 and Pantex comprehensive corrective and preventative maintenance program activities for production related equipment enabling the site to complete modernization, surveillance, and dismantlement deliverables.
- Performed tritium process computing maintenance to support LLCE GTS production and GTS surveillance and classified communications/data management.
- Accepted over 90,000 SNL Weapon Quality units at a 99% NNSA acceptance rate.

Production Operations

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Production Operations $630,894,000	**Production Operations $710,822,000**	**Production Operations +$79,928,000**
Support base labor operations and activities at: • KCNSC: Execute programmatic equipment maintenance, calibration services, analytical sciences, industrial engineering, and production/materials management. • LANL: Support manufacturing of detonators and detonator cable assemblies. • LLNL: Independent quality engineers in support of Stockpile Major Modernization Programs. • Pantex: Executes multi-system hardware procurements, testing & storage. On-site transportation of Special Nuclear Materials and High-Explosives. • Y-12: Support corrective & preventative maintenance for production equipment and accountability & control activities for Special Nuclear Materials. • SNL: Execute programmatic equipment maintenance for MESA & Primary Standards Lab; supports development, qualification & production of Neutron Generator Assemblies. • SRS: Support tritium process controls with classified computing systems and programmatic equipment for GTS reservoir gas analysis.	Support base labor operations and activities at: • KCNSC: Execute programmatic equipment maintenance, calibration services, analytical sciences, industrial engineering, and production/materials management. • LANL: Support manufacturing of detonators and detonator cable assemblies; non-nuclear component focused MQMC. • LLNL: Independent quality engineers in support of Stockpile Major Modernization Programs. • Pantex: Executes multi-system hardware procurements, testing and storage. On-site transportation of SNM and High-Explosives. • Y-12: Support corrective and preventative maintenance for production equipment and accountability and control activities for SNM. • SNL: Execute programmatic equipment maintenance for Microsystems and Engineering Sciences Applications Complex (MESA) and Primary Standards Lab; supports development, qualification, and production of NG Assemblies; supports Power Sources and Energetics. • SRS: Support tritium process controls with classified computing systems and programmatic equipment for GTS reservoir gas analysis. • HQ: Execute base operations for New Brunswick Laboratory; supports and executes Enterprise Capacity modeling across the NNSA Nuclear Enterprise.	The $79.9 million increase represents base capability support for Power Sources and Energetics and the MQMC; New Brunswick Laboratory Operations; NNSA Enterprise Capacity Modeling; and continued hiring of critical skilled labor resources to support increase in production activities. • Power Sources and Energetics: this is scope includes ~30 FTEs previously funded by tails (NA-125), and includes equipment and software procurements, and preventative/corrective equipment maintenance. This scope provides base capability maintenance and technology for testing services, data collection, and quality assurance records on products. • Mark Quality Manufacturing Center (MQMC): this scope includes ~15 FTEs, previously funded by tails (NA-122 and NA-125), and includes equipment and software equipment, and preventative/corrective equipment maintenance. • New Brunswick Laboratory: This scope includes ~10 FTEs previously funded by NA-10 Corporate Assessment funding. This scope provides base capability operations support for the storage, packing, shipping, and routine maintenance of Certified Reference Materials (CRMs). • NNSA Enterprise Capacity Modeling: This scope includes ~15 FTEs previously funded by NA-10 Corporate Assessment funding and includes software procurements.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
		• Hiring: Production Operations is 90% labor and needs to maintain critical hiring needs to meet NA-125, NA-122, and NA-19 Modernization Programs requirements and schedules

Stockpile Management
Nuclear Enterprise Assurance

Overview
NNSA will initiate the Nuclear Enterprise Assurance (NEA) subprogram to actively manage subversion risks to nuclear weapons and associated design, production, and testing capabilities throughout the weapons acquisition process. NEA enables the responsible use of digital technologies in the modernization of weapons, facilities, and engineering capabilities, by preventing, detecting, and mitigating potential consequences of subversion in digital technologies, the supply chain, and other threat pathways. NEA includes technical and governance activities for the assurance of components integral to weapon systems, operational technologies directly related to weapons, and capabilities that cross-cut multiple weapons programs.

Stockpile Management
Nuclear Enterprise Assurance

Description

Nuclear Enterprise Assurance (NEA) ensures the Nuclear Security Enterprise (NSE) actively manages subversion risks to the nuclear weapons stockpile and associated design, production, and testing capabilities from all subversion threat pathways. Of particular concern, digital technologies introduce new vulnerability characteristics and multiple new susceptible pathways that, if compromised, can produce unacceptable physical impacts to safety, the environment, weapon performance, and loss of capabilities. Using the nuclear weapon digital assurance (NWDA) process (the component of NEA focused on digital threats), NEA enables risk-managed adoption of leading-edge technologies to meet emerging military requirements and reduce modernization schedules and costs. NEA maintains a team of multi-disciplinary experts who perform rapid assessments, develop tools and assurance methods, and provide recommended mitigations. Close coordination is maintained across NNSA and other agencies to stay informed of current threats and best practices.

NEA focuses on technical and governance activities for the assurance of systems integral to weapon systems, operational technologies directly related to weapons, and capabilities that cross-cut multiple weapons programs. The NEA program has four major activities:

(1) **Assurance Evaluations and Recommendations –** Cross-site, multi-disciplinary teams of subject matter experts from all NNSA sites who rapidly perform vulnerability risk assessments; develop and mature assurance methods; and provide recommended mitigations and implementation plans across NNSA programs. These activities also address non-program-specific NEA risks (e.g., supply chain integrity) through cross-cutting capabilities and process development.

(2) **Tools and Capabilities** – Cross-cutting and non-program-specific tools and capabilities that assist in vulnerability discovery, consequence analysis, and mitigation implementation.

(3) **Policy, Requirements, and Oversight** – Activities include developing and informing NNSA and DOE policies, orders, and directives to ensure integrated governance and compliance with federal law; coordination with DOD and UK partners; and establishing quantifiable metrics to assess the performance of NEA policies, requirements, and NSE execution.

(4) **Workforce Standards** – Creates standards and processes for NSE-wide NEA awareness, training, and skills development. Activities include integrating an NWDA approach for weapons and associated design, production, and testing capabilities throughout the NSE.

Highlights of the FY 2024 Budget Request

- Establish cross-site, multi-disciplinary assurance capability.
- Address highest priority subversion risks at each of the eight NNSA sites.
- Institute cybersecurity of nuclear weapon policy, requirements, and oversight processes.
- Establish, update, and expand NEA training and qualification programs.

FY 2025 – FY 2028 Key Milestones

- Across multiple Fiscal Years:
  - Address most significant subversion risks as determined by mission impact at all eight NNSA sites.
  - Institutionalize NEA policy, training, and qualification programs across NNSA.
  - Integrate cybersecurity risk management into the existing nuclear weapon acquisition process (Phase X and 6.X).
  - Mature countersubversion tools and capabilities and assurance standards for the workforce.

- **FY 2022 Accomplishments**
  - New Program starting in FY 2023.

Nuclear Enterprise Assurance (NEA)

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Enterprise Assurance (NEA) $48,911,000	**Nuclear Enterprise Assurance (NEA) $66,614,000**	**Nuclear Enterprise Assurance (NEA) +$17,703,000**
• Develop cybersecurity of Nuclear Weapon Information Technology (NWIT) policy, processes, and requirements. • Establish initial NWIT training and certification program. • Establish a government-led NEA Core Team of multidisciplinary subject matter experts (SMEs). • Establish NEA Core Team qualification program. • Initiate site-specific NEA subject matter expert teams. • Develop implementation plan for long-term assurance of non-nuclear components logistics systems. • Complete NEA assessments and mitigation plans for highest mission-consequence operational technologies at each of the eight NNSA sites. • Improve and expand NEA assurance laboratories and tools.	• Establish cybersecurity of NWIT policy, processes, and requirements. • Maintain a government-led NEA Core Team of multidisciplinary subject matter experts, to include a qualification program. • Maintain site-specific NEA SMEs. • Continue NEA assessments and mitigation plans for subsequent mission-critical operational technologies at each NSE site. • Establish NEA measure-of-success process. • Determine scope of materials vulnerability for the Materials Vulnerability Assessment and Forensics Center. • Procure equipment for the Nuclear Weapon Cyber Assurance Laboratory. • Establish additional NW cybersecurity assurance laboratories. • Upgrade supply chain assurance laboratory. • Execute NEA incident response exercises. • Execute Enterprise Assurance Workshop. • Conduct IT/OT integration exercises. • Establish a comprehensive awareness, proficiency, and mastery NEA training program.	• The $17.7 million increase represents the ramp-up of NEA as it grows into an established program dedicated to actively managing subversion risks to the nuclear weapons stockpile and associated design, production, and testing capabilities. This increase will expand vulnerability discovery execution, procure vulnerability discovery/analysis tools, and establish NEA laboratory capabilities.

Stockpile Management
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	38,823	41,657	44,531	+2,874
DARHT Detection Chamber (DDC), LANL	5,000	0	0	5,000	0	-5,000
Isostatic Hot Press, LANL	8,400	0	0	8,400	0	-8,400
Life Extension Program Project 4, Y12	28,750	2,800	25,950	0	0	0
South e-Beam Welder Project, Y-12	15,200	0	15,200	0	0	0
GB03 Airlock/Hood Replacement & Upgrades, Y-12	8,300	0	300	8,000	0	-8,000
Large Graphite/VTL Lathe #1, Y-12	5,000	0	0	5,000	0	-5,000
Graphite Drying Oven #1, Y-12	5,000	0	0	5,000	0	-5,000
General Shop Drying Oven, Y-12	5,000	0	0	5,000	0	-5,000
Coordinate Measuring Machine #1, Y-12	5,000	0	0	5,000	0	-5,000
Coordinate Measuring Machine #2, Y-12	0	0	0	0	0	0
Coordinate Measuring Machine #3, Y-12	0	0	0	0	0	0
Coordinate Measuring Machine #5, Y-12	0	0	0	0	0	0
Ultrasonic Machine #2, Y-12	5,200	0	0	5,200	0	-5,200
Ultrasonic Machine #3, Y-12	5,200	0	0	5,200	0	-5,200
Ultrasonic Machine #4, Y-12	5,200	0	0	5,200	0	-5,200
Ultrasonic Machine #5, Y-12	5,200	0	0	5,200	0	-5,200
Ultrasonic Machine #6, Y-12	5,200	0	0	5,200	0	-5,200
Graphite Drying Oven #2, Y-12	5,000	0	0	0	5,000	+5,000
Solution Heat Treat Furnace, Y-12	18,000	0	0	0	18,000	+18,000
9204-2E High Temperature Ovens (Final Assembly), Y-12	18,000	0	0	0	18,000	+18,000
9201-5N Dye Pent/Ultrasonic Tanks, Y-12	0	0	0	0	0	0
Component Canning Box, Y-12	0	0	0	0	0	0
Large Graphite/VTL Lathe #2, Y-12	0	0	0	0	0	0
Large Graphite Lathe #3, Y-12	0	0	0	0	0	0
9204-2E GB04 Drum Transfer Station, Y-12	0	0	0	0	0	0
Coordinate Measuring Machine #4, Y-12	0	0	0	0	0	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**80,273**	**109,057**	**85,531**	**-23,526**

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	46,598	47,576	48,575	49,595	N/A
Coordinate Measuring Machine #2, Y-12	5,000	0	0	0	0
Coordinate Measuring Machine #3, Y-12	0	0	5,000	0	0
Coordinate Measuring Machine #4, Y-12	0	5,000	0	0	0
Coordinate Measuring Machine #5, Y-12	5,000	0	0	0	0
9201-5N Dye Pent/Ultrasonic Tanks, Y-12	18,000	0	0	0	0
Component Canning Box, Y-12	0	0	15,000	0	0
Large Graphite/VTL Lathe #2, Y-12	0	0	5,000	0	0
Large Graphite Lathe #3, Y-12	0	0	5,000	0	0
9204-2E GB04 Drum Transfer Station, Y-12	5,000	0	0	0	0
Total, Capital Equipment (including MIE)	**79,598**	**52,576**	**78,575**	**49,595**	**N/A**

Production Modernization

Overview
The Production Modernization program is responsible for modernizing the facilities, infrastructure, and equipment that produce materials and components to meet stockpile requirements and maintain the Nation's nuclear deterrent. The program encompasses five major subprograms that sustain the Nation's nuclear weapons stockpile.

1. The Primary Capability Modernization program consolidates the management of primary-stage material processing and component production capabilities in the National Nuclear Security Administration's (NNSA) nuclear security enterprise. The program includes (1) Plutonium Modernization and (2) High Explosives and Energetics (HE&E) Modernization.
2. The Secondary Capability Modernization program restores and enhances manufacturing capabilities for the secondary stage to the required levels in the nuclear security enterprise. This includes ensuring the availability of strategic materials and other sub-component streams necessary for the secondary stage, as well as modernizing the facilities and operations required to process these materials, fabricate them into parts, and assemble the final components. The program includes (1) Uranium Modernization, (2) Depleted Uranium Modernization, (3) Lithium Modernization, and (4) Special Materials.
3. The Tritium and Domestic Uranium Enrichment program consists of two parts: (1) Tritium Modernization produces, recovers, and recycles tritium to support national security requirements and (2) Domestic Uranium Enrichment (DUE) establishes a reliable supply of enriched uranium to support U.S. national security needs.
4. The Non-Nuclear Capability Modernization (NNCM) program modernizes the capabilities needed the for design, qualification, production, and surveillance of non-nuclear components for multiple weapon systems. NNCM activities include recapitalizing existing equipment and infrastructure, developing new capabilities, providing additional capacity, and implementing strategies to drive efficiencies.
5. The Capability Based Investments (CBI) program executes projects for equipment, tools, supporting facilities, and infrastructure directly related to enduring, multi-program weapon activity capabilities, mission deliverables, and management of programmatic risk across the nuclear security enterprise.

The Production Modernization program:
1. Provides funding for efforts across the nuclear security enterprise to restore the Nation's capability to produce 80 plutonium pits per year (ppy).
2. Enables sustainment and modernization of high explosives and energetics infrastructure across the nuclear security enterprise and capabilities necessary for the timely delivery of qualified high explosive, pyrotechnic, and propellant materials to meet current and future stockpile requirements.
3. Provides funding to modernize uranium operations to ensure delivery of secondary components needed to maintain the stockpile as well as provide support to the U.S. Navy and nonproliferation programs.
4. Enables the restart and modernization of lapsed depleted uranium (DU) alloying and component manufacturing capabilities to ensure NNSA can meet short- and long-term mission requirements.
5. Maintains the production of the Nation's enriched lithium supply in support of Defense Programs, the Department of Energy (DOE) Office of Science, the Department of Homeland Security, and other customers.
6. Operates the national capability for producing, recycling, and recovering tritium and is expanding capacity to reliably meet additional national security requirements.
7. Provides funding to modernize capabilities for the production and qualification of non-nuclear components for multiple weapon systems.
8. Provides funding for risk reduction through recapitalization or enhancement of core scientific and manufacturing capabilities.

Line-Item Construction
Production Modernization line-item construction projects are critical to revitalizing the program-specific capabilities that directly support the nuclear weapons programs. These projects ensure the strategic material industrial base necessary for stockpile modernization is constructed for the nuclear security enterprise and will provide the base materials for component production. These projects will also replace obsolete, unreliable facilities and infrastructure to reduce safety and program risk while improving responsiveness, capacity, and capabilities.

Production Modernization
Funding
Comparable

	($K)				
	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Production Modernization					
Primary Capability Modernization					
Plutonium Modernization					
Los Alamos Plutonium Modernization					
Los Alamos Plutonium Operations	**660,419**	**767,412**	**833,100**	**+65,688**	**+8.6%**
21-D-512, Plutonium Pit Production Project, LANL	**350,000**	**588,234**	**670,000**	**+81,766**	**+13.9%**
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	**27,000**	**30,002**	**30,000**	**-2**	**0%**
07-D-220-04 Transuranic Liquid Waste Facility, LANL	**30,000**	**24,759**	**0**	**-24,759**	**-100.0%**
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	**138,123**	**138,123**	**227,122**	**+88,999**	**+64.4%**
Total, Los Alamos Plutonium Modernization	**1,205,542**	**1,548,530**	**1,760,222**	**+211,692**	**+13.7%**
Savannah River Plutonium Modernization					
Savannah River Plutonium Operations	**128,000**	**58,300**	**62,764**	**+4,464**	**+7.7%**
21-D-511, Savannah River Plutonium Processing Facility, SRS	**475,000**	**1,200,000**	**858,235**	**-341,765**	**-28.5%**
Total, Savannah River Plutonium Modernization	**603,000**	**1,258,300**	**920,999**	**-337,301**	**-26.8%**
Enterprise Plutonium Support	**107,098**	**88,993**	**87,779**	**-1,214**	**-1.4%**
Total, Plutonium Modernization	**1,915,640**	**2,895,823**	**2,769,000**	**-126,823**	**-4.4%**
High Explosives & Energetics					
High Explosives & Energetics	**68,785**	**101,380**	**93,558**	**-7,822**	**-7.7%**
23-D-516, Energetic Materials Characterization Facility, LANL	**0**	**19,000**	**0**	**-19,000**	**-100.0%**
21-D-510, HE Synthesis, Formulation, and Production, PX	**44,500**	**108,000**	**0**	**-108,000**	**-100%**
15-D-301 HE Science & Engineering Facility, PX	**0**	**20,000**	**101,356**	**+81,356**	**+406.8%**
Total, High Explosives & Energetics	**113,285**	**248,380**	**194,914**	**-53,466**	**-21.5%**
Total, Primary Capability Modernization	**2,028,925**	**3,144,203**	**2,963,914**	**-180,289**	**-5.7%**
Secondary Capability Modernization	**488,097**	**536,363**	**666,914**	**+130,551**	**+24.3%**
18-D-690, Lithium Processing Facility, Y-12	**167,902**	**216,886**	**210,770**	**-6,116**	**-2.8%**
06-D-141, Uranium Processing Facility, Y-12	**600,000**	**362,000**	**760,000**	**+398,000**	**+109.9%**
Total, Secondary Capability Modernization	**1,255,999**	**1,115,249**	**1,637,684**	**+522,435**	**+46.8%**

	($K)				
	FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Tritium and Domestic Uranium Enrichment	**489,017**	**506,649**	**592,992**	**+86,343**	**+17.0%**
18-D-650, Tritium Finishing Facility, SRS	**27,000**	**73,300**	**0**	**-73,300**	**-100.0%**
Total, Tritium and Domestic Uranium Enrichment	**516,017**	**579,949**	**592,992**	**+13,043**	**+2.2%**
Non-Nuclear Capability Modernization					
Non-Nuclear Capability Modernization	**144,563**	**123,084**	**166,990**	**+43,906**	**+35.7%**
22-D-513, Power Sources Capability, SNL	**13,827**	**0**	**37,886**	**+37,886**	**0%**
Total, Non-Nuclear Capability Modernization	**158,390**	**123,084**	**204,876**	**+81,792**	**+66.5%**
Capability Based Investments	**187,566**	**154,220**	**156,462**	**+2,242**	**+1.5%**
Planning for Programmatic Construction (Pre-CD-1)	**10,000**	**0**	**0**	**0**	**0%**
Total, Production Modernization	**4,156,897**	**5,116,705**	**5,555,928**	**+439,223**	**+8.6%**

[a] The FY 2022 amounts are comparable with the FY 2023 enacted structure which aligned programmatic construction with the portfolio each project supports and moved Capability Based Investments from Infrastructure & Operations to Production Modernization.

Production Modernization
Outyear Funding

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Production Modernization				
Primary Capability Modernization				
Plutonium Modernization				
Los Alamos Plutonium Modernization				
Los Alamos Plutonium Operations	**845,867**	**898,394**	**927,493**	**1,004,113**
21-D-512, Plutonium Pit Production Project, LANL	**680,141**	**710,000**	**715,500**	**730,000**
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	**34,475**	**2,000**	**0**	**0**
07-D-220-04, Transuranic Liquid Waste Facility, LANL	**0**	**0**	**0**	**0**
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	**77,000**	**21,204**	**0**	**0**
Total, Los Alamos Plutonium Modernization	**1,637,483**	**1,631,598**	**1,642,993**	**1,734,113**
Savannah River Plutonium Operations	**74,296**	**112,373**	**144,654**	**164,281**
21-D-511, Savannah River Plutonium Processing Facility, SRS	**1,100,000**	**1,200,000**	**1,200,000**	**1,230,000**
Total, Savannah River Plutonium Modernization	**1,174,296**	**1,312,373**	**1,344,654**	**1,394,281**
Enterprise Plutonium Support	**94,744**	**95,342**	**95,294**	**104,323**
Total, Plutonium Modernization	**2,906,523**	**3,039,313**	**3,082,941**	**3,232,717**
High Explosives & Energetics				
High Explosives & Energetics	**105,675**	**128,451**	**106,632**	**113,004**
28-D-XXX, Radiography / Assembly Complex Replacement, LANL	**0**	**0**	**0**	**36,946**
23-D-516, Energetic Materials Characterization Facility, LANL	**0**	**0**	**19,000**	**102,000**
21-D-510, HE Synthesis, Formulation, and Production, PX	**0**	**0**	**38,838**	**185,865**
15-D-301 HE Science & Engineering Facility, PX	**0**	**0**	**0**	**0**
Total, High Explosives & Energetics	**105,675**	**128,451**	**164,470**	**437,815**
Total, Primary Capability Modernization	**3,012,198**	**3,167,764**	**3,247,411**	**3,670,532**
Secondary Capability Modernization	**692,653**	**733,714**	**765,370**	**820,874**
26-D-XXX, Agile Radiation Case and Component Capability, Y-12	**0**	**50,000**	**75,000**	**200,000**
18-D-690, Lithium Processing Facility, Y-12	**280,000**	**290,000**	**285,000**	**22,613**
06-D-141, Uranium Processing Facility, Y-12	**550,000**	**400,000**	**225,000**	**57,613**
Total, Secondary Capability Modernization	**1,522,653**	**1,473,714**	**1,350,370**	**1,101,100**

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Tritium and Domestic Uranium Enrichment	**635,659**	**656,090**	**670,553**	**675,077**
18-D-650, Tritium Finishing Facility, SRS	**0**	**0**	**120,000**	**200,000**
Total, Tritium and Domestic Uranium Enrichment	**635,659**	**656,090**	**790,553**	**875,077**
Non-Nuclear Capability Modernization				
Non-Nuclear Capability Modernization	**141,688**	**144,559**	**162,522**	**163,374**
22-D-513, Power Sources Capability, SNL	**71,083**	**73,902**	**79,824**	**45,136**
Total, Non-Nuclear Capability Modernization	**212,771**	**218,461**	**242,346**	**208,510**
Capability Based Investments	**153,244**	**154,289**	**161,519**	**162,628**
Warhead Assembly				
Warhead Assembly Operations	**24,000**	**62,500**	**55,000**	**116,366**
18-D-680 Material Staging Facility, PX	**0**	**0**	**0**	**0**
Total, Warhead Assembly	**24,000**	**62,500**	**55,000**	**116,366**
Total, Production Modernization	**5,560,525**	**5,732,818**	**5,847,199**	**6,134,213**

Production Modernization
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)

Production Modernization
Plutonium Modernization
Los Alamos Plutonium Modernization

Los Alamos Plutonium Operations	**+65,688**
Increase supports a ramp in engineering evaluations and certification activities to produce the first war reserve (WR) plutonium pit in concert with increased equipment purchases/installation activities and the hiring, training, and qualification of additional staff to support the WR pit production ramp-up.	
21-D-512, Plutonium Pit Production Project, LANL	**+81,766**
Increase allows for the establishment of a performance baseline for the 30 ppy reliable equipment set, continue design efforts for the training center, and updates to acquisition/tailoring for the remainder of the subprojects at Los Alamos National Laboratory's (LANL) Plutonium Facility (PF)-4.	
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	**-2**
No significant change.	
07-D-220-04, Transuranic Liquid Waste Facility, LANL	**-24,759**
Decrease reflects the revised Critical Decision 2/3 funding profile and the use of carryover to execute construction activities.	
04-D-125, Chemistry and Metallurgy Research Replacement, Project, LANL	**+88,999**
Increase reflects baselining for the Radiological Laboratory and Utility Office Building Hazard Category 3 (RC3) and PF-4 Equipment Installation Phase 2 (PEI2) subprojects and the start of construction activities for both sub-projects.	
Savannah River Plutonium Modernization	
Savannah River Plutonium Operations	**+4,464**
Increase supports activities necessary to mature the Savannah River Site (SRS) Program Office, develop plans to optimize the schedule from Savannah River Plutonium Processing Facility (SRPPF) CD-4 approval to full rate production, and build production competency.	
21-D-511, Savannah River Plutonium Processing Facility, SRS	**-341,765**
Decrease reflects the use of carryover to execute design and CD-3X construction activities.	

	FY 2024 Request vs FY 2023 Enacted ($)
Enterprise Plutonium Support No significant change.	**-1,214**
High Explosives and Energetics	
High Explosives and Energetics Decrease reflects the planned profile for the establishment of a high explosives production capability at the Naval Surface Warfare Center Indian Head Division (NSWC IHD). That decrease is offset by an increase for HE Science and Engineering Facility (HESE) OPCs.	**-7,822**
23-D-516, Energetic Materials Characterization Facility, LANL Decrease reflects reprioritization across the Production Modernization construction portfolio, recognizing the nuclear security enterprise's capacity to execute construction and maintaining a focus on finishing projects currently under construction.	**-19,000**
21-D-510, HE Synthesis, Formulation, and Production, PX Decrease reflects reprioritization across the Production Modernization construction portfolio, recognizing the nuclear security enterprise's capacity to execute construction and maintaining a focus on finishing projects currently under construction.	**-108,000**
15-D-301, HE Science and Engineering Facility, PX Increase reflects continued construction activities. FY 2024 funding will be used for construction with on-site mobilization, and to execute the main works construction contract.	**+81,356**
Secondary Capability Modernization Increase reflects planned investments in critical DU modernization projects (DU Feedstock Supply & Procurement, Binary Production), uranium modernization projects, special materials planned investments. In addition, the increase reflects emerging mission demands, such as modernizing Analytical Chemistry Operations as part of a broader Quality Modernization effort at Y-12 and ensuring the Assembly, Disassembly, Dismantlement and Surveillance capability can meet future demands. Lastly, the increase reflects the ramping up of special materials activities.	**+130,551**
18-D-690, Lithium Processing Facility, Y-12 Decrease reflects use of carryover to execute CD-3A scope in FY 2024 on time while keeping the project on schedule and within the CD-1 cost range. This funding level fully supports starting to execute all CD-3A scope in FY 2024 on time while keeping the project on schedule and within the CD-1 cost range.	**-6,116**
06-D-141, Uranium Processing Facility, Y-12 Increase supports execution of construction, startup testing, and commissioning activities for the Main Process Building, Salvage and Accountability Building, and Process Support Facility.	**+398,000**

	FY 2024 Request vs FY 2023 Enacted ($)
Tritium and Domestic Uranium Enrichment Increase reflects needs for labor and material purchases for Domestic Uranium Enrichment centrifuge development as the program advances towards larger-scale research and development (R&D) demonstrations. In FY 2024, the Domestic Uranium Enrichment Centrifuge Experiments (DUECE) program begins procurement activities for centrifuge machines in engineering scale demonstration cascade DCAS2 facility, as well as equipment purchases related to TRL manufacturing maturation. Increase also reflects the initiation of design activities for a DUE Pilot Plant, activities to leverage the Office of Nuclear Energy's plan to procure high-assay low-enriched uranium from industry to support defense needs. The increase is partially offset by the use of prior year carryover.	**+86,343**
18-D-650, Tritium Finishing Facility, SRS Decrease reflects reprioritization across the Production Modernization construction portfolio, recognizing the nuclear security enterprise's capacity to execute construction and maintaining a focus on finishing projects currently under construction. Carryover will be used to bring the design to 30% complete and to execute the site prep subproject.	**-73,300**
Non-Nuclear Capability Modernization Increase reflects support for the Kansas City expansion efforts and modernization of equipment to develop and produce trusted radiation-hardened microelectronics at Sandia National Laboratories.	**+43,906**
22-D-513, Power Sources Capability, SNL Increase reflects a return to project execution, following value engineering efforts to reduce excessive scope in the initial conceptual design.	**+37,886**
Capability Based Investments No significant change.	**+2,242**
Total, Production Modernization	**+439,223**

Production Modernization
Primary Capability Modernization

Overview

The Primary Capability Modernization program consolidates the management of primary-stage material processing and component production capabilities in the NNSA nuclear security enterprise. The program includes (1) Plutonium Modernization and (2) High Explosives and Energetics Modernization.

Description

The Plutonium Modernization program provides funding for efforts across the nuclear security enterprise to restore the Nation's capability to produce 80 ppy. NNSA will provide additional details regarding Plutonium Modernization activities to Congressional staff through quarterly pit production briefings, as required by the FY 2020 Energy and Water Development and Related Agencies Appropriations Act. NNSA remains committed to achieving the pit production capability goals on the path to 80 ppy, including the capability to produce not less than 30 pits, at LANL.

Plutonium Modernization activities include the following:

- **Los Alamos Plutonium Modernization**: Activities include Los Alamos Plutonium Operations, which provides for the operational expenses needed to meet pit production requirements at LANL, including activities to hire, train, qualify, and retain required pit production personnel; recapitalization of equipment for WR pit production; pit production process qualification and certification activities; tooling design and fabrication; and Plutonium Modernization's share of operational expenses for PF-4. This funding also supports the manufacturing of precision plutonium devices for science-related evaluation. In FY 2024, LANL will continue process qualification and certification activities to produce the first WR pit. LANL Plutonium Operations also provides funding for key support services and safety management programs in PF-4, including a radiological control program, facility, equipment maintenance, a criticality safety program, shipping and receiving, authorization basis, work control documentation, training and qualification, waste management, material handling and storage, and facility availability to maintain plutonium capabilities.

  Activities within Los Alamos Plutonium Modernization also include the Los Alamos Plutonium Pit Production Project (LAP4), 21-D-512. This project will manage capital acquisitions required to increase production capacity at PF-4 to no fewer than 30 ppy, as well as associated infrastructure investments at LANL to support pit production. FY 2024 funding will support efforts to mature design documentation for the training facility and the 30R equipment subproject, continue the removal of legacy equipment in PF-4, install new production equipment, and support the baselining and start of construction of the west entry control facility.

  The TA-55 Reinvestment Project, Phase 3, 15-D-302 funding will continue construction activities to modernize fire alarm panels providing a vital safety function in PF-4.

  The Transuranic Liquid Waste Facility (TLW), 07-D-220-04 carryover funding will support the construction of a new hazard category 3 nuclear facility to house processing equipment capable of treating transuranic (TRU) liquid waste, a TRU liquid influent storage, and necessary utilities.

  The Chemistry and Metallurgy Research Replacement Project, 04-D-125 funding will be used to continue design and baseline the RC3 subproject and aid in early construction/procurement of long-lead items. Funding in FY 2024 for the PEI2 subproject will support construction activities to improve TA-55 and PF-4 personnel and vehicular ingress/egress, levels of worker preparation/staging and warehousing for relocated AC/MC operations and personnel, and procurement and installation of equipment.

- **Savannah River Plutonium Modernization**: Supports the establishment of a program office at SRS to enable pit production development efforts, train and hire future production staff, and support future production and operations planning. Until an appropriate training center is fully operational, SRS will use existing facilities at both SRS and LANL to support training activities.

Additionally, the Savannah River Plutonium Processing Facility (SRPPF) project, 21-D-511, repurposes the partially completed Mixed Oxide Fuel Fabrication Facility (MFFF) to achieve a production capability of 50 ppy consistent with the NNSA's recommended alternative for pit production. FY 2024 activities focus on maturing the design of the main process building, which includes production equipment and gloveboxes, safety systems, facility utilities, and support infrastructure. Other supporting activities will continue to focus on the design of subprojects for utilities/site preparation, administrative buildings, the high-fidelity training and operations center, as well as continued early site work such as Dismantle & Removal (D&R) of old MFFF equipment, wall coatings removal, early procurements of long lead equipment items and early work on the Sandfilter and Fanhouse Subproject.

- **Enterprise Plutonium Support:** Provides funding for activities that support pit production across the nuclear security enterprise, including Kansas City National Security Campus production of non-nuclear components, certification activities, management of the plutonium pit Product Realization Team (PRT) at Lawrence Livermore National Laboratory (LLNL), plutonium material supply activities at Pantex, and material management and supporting storage activities at the Nevada National Security Site (NNSS).

Highlights of the FY 2024 Budget Request

- Support pit production capability modernization in accordance with Department of Defense requirements.
- Qualify pit production processes and perform certification tests to produce the first WR pit.
- Continue investments to install additional production equipment and recapitalize end-of-life equipment in PF-4 to reduce pit production mission risk.
- Continue hiring, training, and qualifying staff to ramp up future pit production.
- Improve PF-4 vault facilities efficiency through inventory work-off and optimization of footprint to support the transition to plutonium production and improve Material at Risk (MAR) posture.
- Provide storage/staging and inventory management capabilities in support of the plutonium pit production mission.
- Continue to mature the new SRS Plutonium Operations program to include expanded knowledge transfer and training.
- Continue efforts to mature the design of the SRPPF project.
- Continue execution of CD-3A, Long Lead Procurement, and Site Preparation, for SRPPF that includes dismantling and removing equipment, commodities, and structures from the interior of building 226-F.

FY 2025 – FY 2028 Key Milestones

- Achieve initial 30 pits per year production capability (2026), with CD-4 for the 30B LAP4 subproject planned for 2030.
- Obtain CD-2/3 for SRPPF (2025).
- Obtain CD-4 for High-Fidelity Training and Operations Center (HFTOC) as part of SRPPF (2028).
- Obtain CD-4 for West Entry Control Facility as part of LAP4 (2028).

FY 2022 Accomplishments

- Produced 7 pit builds in PF-4 successfully to support process qualification and product certification toward WR pit production.
- Installed equipment in PF-4 to support increased production.
- Improved Transuranic (TRU) waste management and characterization capabilities to support safe and efficient TRU waste disposition at LANL.
- Executed material movements at NNSS in support of the plutonium pit production mission.
- Achieved placement of 6 Full-Time Equivalents (FTEs) of mutual support to LANL production activities that build on the Knowledge Transfer Program (KTP).
- Obtained LAP4 CD-2/3 for D&D activities in November 2021 and obtained CD-3A and 3B approvals in January 2022 and August 2022 respectively for long-lead procurements of gloveboxes and equipment.
- Obtained TLW CD-2/3 on January 6, 2022.
- Approved CD-3A, Long Lead Procurement, and Site Preparation, for SRPPF Main Process Building Subproject in August 2022.

Plutonium Modernization

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Plutonium Modernization $2,895,823,000	**Plutonium Modernization $2,769,000,000**	**Plutonium Modernization -$126,823,000**
Los Alamos Plutonium Modernization $1,548,530,000	***Los Alamos Plutonium Modernization $1,760,222,000***	***Los Alamos Plutonium Modernization +$211,692,000***
Los Alamos Plutonium Operations $767,412,000	***Los Alamos Plutonium Operations $833,100,000***	***Los Alamos Plutonium Operations +$65,688,000***
• Maintain base personnel while adding additional personnel to ramp up work and sustain pit-manufacturing capability. • Continue to recapitalize end-of-life equipment vital to the pit manufacturing mission. • Continue engineering evaluation of processes and conduct pit certification activities. • Provide safe and secure storage and staging capabilities, management of nuclear materials, and disposition planning (including analysis, forecasting, and modeling) in support of plutonium missions at LANL. • Continue to recover, recycle, and disposition of programmatic nuclear materials in support of the pit production mission at LANL. • De-inventory legacy special nuclear material at CMR, including analytical sample reserves, in accordance with the CMR Facility Exit Plan. • Continue support of TRP-III and TLW OPCs.	• Maintain base personnel while adding additional personnel to ramp up work and sustain pit-manufacturing capability. • Continue to recapitalize end-of-life equipment vital to the pit manufacturing mission. • Continue engineering evaluation of processes and conduct pit certification activities. • Produce First Production Unit (FPU) of a WR pit. • Provide safe and secure storage and staging capabilities, management of nuclear materials, and disposition planning (including analysis, forecasting, and modeling) in support of plutonium missions at LANL. • Continue to recover, recycle, and disposition of programmatic nuclear materials in support of the pit production mission at LANL. • De-inventory legacy special nuclear material at CMR, including analytical sample reserves, in accordance with the CMR Facility Exit Plan. • Continue support of TRP-III and TLW OPCs.	• Increase supports a ramp-up in engineering evaluations and activities supporting the production of the first WR plutonium pit in concert with increased equipment purchases/installation activities and the hiring, training, and qualification of additional staff to support the WR pit production ramp-up.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
21-D-512 Plutonium Pit Production Project, LANL $588,234,000	***21-D-512 Plutonium Pit Production Project, LANL $670,000,000***	***21-D-512 Plutonium Pit Production Project, LANL +$81,766,000***
• Complete design documentation for WECF. • Work on the design for the training center. • Achieve CD-2/3 for multiple subprojects. • Continue pursuing long-lead procurements of gloveboxes and standalone equipment.	• Install equipment to expand pit production capacity in PF-4 and start construction of the west entry control facility. • Continue design actives for the 30 Reliable Equipment Installation and Training and Development Center subprojects.	• Additional funding is required to meet the project funding profile. This funding will be used to continue design for the 30R subproject.
15-D-302 TA-55 Reinvestments Project, Phase 3, LANL $30,002,000	***15-D-302 TA-55 Reinvestments Project, Phase 3, LANL $30,000,000***	***15-D-302 TA-55 Reinvestments Project, Phase 3, LANL -$2,000***
• Continue construction activities.	• Continue construction activities.	• No significant change.
07-D-220-04, Transuranic Liquid Waste Facility, LANL $24,759,000	***07-D-220-04, Transuranic Liquid Waste Facility, LANL $0***	***07-D-220-04, Transuranic Liquid Waste Facility, LANL -$24,759,000***
• Restart construction activities.	• Continue construction activities using carryover funds.	• Decrease reflects the revised CD-2/3 funding profile and the use of carryover to execute construction activities.
04-D-125 Chemistry and Metallurgy Research Replacement Project, LANL $138,123,000	***04-D-125 Chemistry and Metallurgy Research Replacement Project, LANL $227,122,000***	***04-D-125 Chemistry and Metallurgy Research Replacement Project, LANL +$88,999,000***
• Obtain CD-3C for long-lead procurement items for the PEI2 subproject. • Obtain CD-2/3 on the PEI2 subproject. • Continue construction of ingress and egress facilities and design activities for equipment installation.	• Continue construction activities. • Obtain CD-2/3 on the RC3 subproject. • Continue procurements and construction activities for PEI2.	• Increase reflects ramp-up of construction for PEI2 as well as baselining and start of construction for RC3.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Savannah River Plutonium Modernization **$1,258,300,000**	**Savannah River Plutonium Modernization** **$920,999,000**	**Savannah River Plutonium Modernization** **-$337,301,000**
Savannah River Plutonium Operations ***$58,300,000***	***Savannah River Plutonium Operations*** ***$62,764,000***	***Savannah River Plutonium Operations*** ***+$4,464,000***
• Continue to mature the SRS program office to support future production activities. • Hire and train staff.	• Continue to mature the SRS program office to support future production activities. • Hire and train staff.	• Funding profile increases as the time to SRPPF CD-4 shortens to support staff and training requirements.
21-D-511 Savannah River Plutonium Processing Facility, SRS $1,200,000	***21-D-511 Savannah River Plutonium Processing Facility, SRS $858,235,000***	***21-D-511 Savannah River Plutonium Processing Facility, S*****RS -$341,765,000**
• Execute long lead procurement, demolition, removal (D&R), and site preparation activities. • Support design maturation in anticipation of CD-2.	• Continue executing long lead procurement, D&R, and site preparation activities. • Continue design maturation in support of CD-2.	• Decrease reflects the use of carryover to execute design and CD-3X construction activities.
Enterprise Plutonium Support **$88,993,000**	**Enterprise Plutonium Support** **$87,779,000**	**Enterprise Plutonium Support** **-$1,214,000**
• Continue LLNL certification activities associated with pit production to enable FPU of a WR pit at LANL in 2023. • Continue KCNSC non-nuclear component production. • Continue to support PRT management at LLNL. • Execute material management and supporting storage activities at NNSS. • Plan and execute shipping activities for plutonium material supply from Pantex.	• Continue LLNL certification activities associated with pit production in support of WR pit production at LANL. • Continue KCNSC non-nuclear component production. • Continue to support PRT management at LLNL. • Execute material management and supporting storage activities at NNSS. • Continue to plan and execute shipping activities for plutonium material supply from Pantex.	• Decrease accounts for reduced certification activities as the program reaches the FPU of a WR pit at LANL.

Primary Capability Modernization
High Explosives and Energetics

Description

The High Explosives and Energetics program focuses on modernization and prioritization of High Explosives (HE) processing facilities and qualification of high explosive, pyrotechnic, and propellant materials for supplying the nuclear security enterprise across five M&O sites (Pantex Plant, SNL, LANL, LLNL, and NNSS). The HE&E program enables the production of HE and energetic materials required for an effective stockpile, including the main charge, boosters, detonators, actuators, timer/drivers, spin rockets, and the materials necessary to achieve nuclear weapon safety and security.

The HE&E program manages the capital investment of the HE&E infrastructure and equipment to modernize manufacturing capabilities in aging facilities and provide efficiencies in material processing to make a safer working environment. Through active supply chain management and modernization projects, the HE&E program ensures the infrastructure and vendor base are in place to meet tight material production requirements to sustain and modernize the stockpile. The HE&E program ensures that materials and capabilities, such as main charge material development, procurement, and characterization, are available and efficient to ensure a safe, secure, and effective stockpile as NNSA continues to modernize the stockpile to meet nuclear deterrent requirements.

The HE&E modernization program will do the following:

1. Manage the HE&E supply chain risk portfolio to ensure an internal nuclear security enterprise and external vendor base to maintain, manufacture, and deploy Mark Quality HE and energetics in support of weapons production.
2. Define and monitor the qualification standards of HE and energetic material.
3. Support the future development and production of novel HE and energetic material.
4. Define and ensure infrastructure capital investment strategies meet both HE&E material and component requirements to sustain and modernize the stockpile.

Highlights of the FY 2024 Budget Request

- Procure energetic material to meet the development and qualification needs of the B61-12, W80-4, W87-1, and W93.
- Assess production modernization and programmatic equipment priorities across the HE&E enterprise to include additive manufacturing from lab to pilot to production scale, radiography/assembly operations at LANL and NNSS, energetics enclaves at LLNL, energetics manufacturing at SNL, and advanced fabrication at Pantex.
- Stabilize the supply chain and enable material/manufacturing maturation, where needed, to meet the energetic material requirements of the current and future stockpile modernization programs.
  - Further develop PBX-9751 as a candidate for future main charge production.
  - Refine manufacturing techniques for PBX 9701 and LX-22
- Complete main works construction efforts for HESE.
- Obtain and demonstrate a new capability for insensitive high explosives qualification to hostile impulse environments by completing the construction of a full-scale testing environment at SNL with a transition to readiness in FY 2024.
- Provide guidance and support for EMC and RACR programmatic activities**.**
- Complete Insensitive High Explosive (IHE) qualification capability recapitalization at LLNL Site 300 to meet W80-4 IHE qualification deliverables.
- Begin High Explosives commissioning at Indian Head to establish a prototype IHE production capability for LX-17 to support the main charge FPU in FY 2029.
- Conduct pilot scale Triaminotrinitrobenzene (TATB) synthesis and LX-17 formulation characterization to ensure LX-17 specification is realized in time for HESFP commissioning.
- Conduct LX-17 development and characterization for the W87-1.
- Demonstrate the nuclear security enterprise's ability to manufacture titanium subhydride ($TiH_{1.65}$) through an advanced equilibrium process to reconstitute titanium subhydride potassium perchlorate (THKP) production.

FY 2025 – FY 2028 Key Milestones

- Achieve CD-4 approval for HESE.
- Achieve Mark Quality material production of PBX-9502 for the W80-4.
- Achieve Mark Quality material production of LX-17 for the W87-1.
- Achieve Mark Quality material production from Indian Head.
- Complete material specification for LX-17 high explosive for the W87-1.
- Conduct the first full-scale live-HE system vulnerability test simulating a cold x-ray environment.
- Develop FK-800 binder risk mitigation plan.

FY 2022 Accomplishments

- Completed specification for TATB and PBX-9502.
- Achieved CD-2/3 for the HESE facility on April 13, 2022.
- Achieved CD-1 and awarded the preliminary and final design contract for HESFP.
- Completed Analysis of Alternatives in January 2021, and CD-1 IPR in July 2022 for the EMC facility.
- Reduced identified risks to supply chains by completing third-party testing to enable permanent shipping authorization of TKP-OP, TKP-IP, and THKP in support of W80-4 actuator production.
- Made significant progress towards reestablishing synthesis formulation of key IHE material components to be used in future Life Extension Programs (LEP).
- Obtained approval from the proponent organizations for revisions to IHE material and IHE subassembly qualification test description and criteria.
- Completed the Development of lot 2 and 3 of PBX-9502 for the W80-4, consisting of 9,000 lbs. total, at Holston Army Ammunition Plant (Holston).
- Completed an independent review to inform the implementation of a new capability for IHE qualification to hostile impulse requirements at full scale.
- Partnered with the DoD for additional upgrades to Holston to further reduce toluene emissions and enable additional TATB production for both the DoD and DOE.
- Manufactured the first production lot of LX-17 main charge material through at Holston in over a decade and assessed material against legacy performance.

High Explosives and Energetics

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
High Explosives and Energetics $101,380,000	**High Explosives and Energetics $93,558,000**	**High Explosives and Energetics -$7,822,000**
• Facilitate the modernization of the HE&E infrastructure across the nuclear security enterprise. • Continue to establish a modern and robust production and manufacturing capability. • Continue to enhance Mark Quality production for next-generation explosive components and materials at SNL. • Produce high explosive material (LX-17 and LX-21) for the W87-1 program, reconstitute TKP-IP for energetic ignitors, process-prove-in PBX-9502 for the B61-12 and qualify PBX-9502 for the W80-4. • Begin high commissioning work at the Indian Head. • Continue pilot plant parameter studies at Pantex and LLNL. • LX-17 specification development.	• Facilitate the modernization of the HE&E infrastructure across the nuclear security enterprise. • Continue to establish a modern and robust production and manufacturing capability. • Reconstitute the energetics supply chain for depleting precursor materials. • Continue to enhance Mark Quality production for next-generation explosive components and materials at SNL. • Continue insensitive high explosives prototyping capability project the Indian Head. • Produce high explosive material (LX-17 and LX-21) for the W87-1 program, reconstitute TKP-IP for energetic ignitors, process-prove-in PBX-9502 for the B61-12 and qualify PBX-9502 for the W80-4 • Continue pilot plant parameter studies at Pantex and LLNL. • Advance manufacturing of PBX 9751 as a candidate for the W93. • Supports HESE OPCs and planning for the Radiography Assembly Complex Replacement project.	• Decrease reflects revision to cost and schedule funding profile needs for Indian Head.
23-D-516 Energetic Materials Characterization Facility, LANL $19,000,000	***23-D-516 Energetic Materials Characterization Facility, LANL $0***	***23-D-516 Energetic Materials Characterization Facility, LANL -$19,000,000***
• Complete DOE 413.3B activities in preparation for a CD-1 decision.	• Project will be on hold for FY 2024.	• Funding is not requested in FY 2024.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
21-D-510 HE Synthesis, Formulation, and Production, PX $108,000,000	***21-D-510 HE Synthesis, Formulation, and Production, PX $0***	***21-D-510 HE Synthesis, Formulation, and Production, PX -$108,000,000***
• Complete the 100% design.	• Project will be on hold for FY 2024.	• Funding is not requested in FY 2024.
15-D-301 HE Science and Engineering Facility, PX $20,000,000	***15-D-301 HE Science and Engineering Facility, PX $101,356,000***	***15-D-301 HE Science and Engineering Facility, PX +$81,356,000***
• Continue the construction of the facility.	• Final delivery and acceptance of blast chambers. • Complete Firewater pump & tank construction. • Complete facility (Main Works) construction. • Move Equipment and Personnel into the facility. • Begin Transition to Operations.	• Increase supports capital equipment purchases, completion of construction, and transition to operations.

Production Modernization
Secondary Capability Modernization

Overview

The Secondary Capability Modernization includes capabilities for the secondary stage of nuclear weapons in the nuclear security enterprise. This includes ensuring the availability of strategic materials and other sub-component material streams that are managed by NNSA, as well as modernizing the facilities and operations required to process these materials, fabricate, and assemble the final components. The program includes (1) Uranium Modernization, (2) Depleted Uranium Modernization, (3) Lithium Modernization, (4) Special Materials, (5) the Lithium Processing Facility (LPF), and (6) the Uranium Processing Facility (UPF).

FY 2024 includes the new subprogram formulated to develop a modern production capability at Y-12 to produce certified Special Materials components to support future weapon system demands.

Major Subprogram Description:

The Secondary Capability Modernization subprograms modernize reconstitute and upgrade capabilities and capacity to provide a robust, flexible, and responsive nuclear security enterprise. The subprograms extend the life of facilities and equipment; mature and insert new technologies for better, safer, and more efficient processes; and construct facilities to support future requirements.

Uranium Modernization provides funding to modernize enriched uranium operations to ensure delivery of secondary components needed to maintain the stockpile and support the Naval Reactors Program and Nonproliferation programs.

Building 9212 at Y-12, which is more than 75 years old, contains the most hazardous enriched uranium operations and does not meet modern nuclear safety and security standards. The Uranium Modernization program implements elements of NNSA's Uranium Mission Strategy associated with decreasing mission dependency on Building 9212. This requires sustained resources across a multi-year period to systematically plan and execute all phases of this effort. Uranium Modernization specifically supports the transition of Building 9212 capabilities into existing facilities and the Uranium Processing Facility (UPF), as well as the implementation of a coordinated transition strategy to end production operations in Building 9212 and begin post-operations deactivation and transition activities.

UPF will provide new floor space for enriched uranium casting, special oxide, and salvage capabilities. The UPF project includes the Main Process Building Salvage and Accountability Building, Mechanical Electrical Building, Process Support Facilities, and Process Support Facilities. Constructing multiple facilities allows each facility to be designed and constructed with a level of safety and security appropriate for the hazards of each operation. FY 2024 funding supports the construction of the Main Process Building, Salvage and Accountability Building, and Process Support Facilities subprojects.

Uranium Modernization is funding work to extend the life of current facilities, Y-12's Building 9215 and Building 9204-2E, that will need to operate safely into the 2040s. Building 9212 operations not moving into the new UPF will be relocated to these facilities. The program is also working to integrate operations in those facilities, along with operations in the Highly Enriched Uranium Materials Facility, with the newly constructed UPF. The program is also improving the responsiveness and resiliency of the enduring facilities by optimizing limited space in the enriched uranium facilities to quickly adjust and accommodate unforeseen operational needs.

The program leverages capability relocations to UPF and the enduring facilities by modernizing existing enriched uranium capabilities developing and deploying new technologies to reduce cost and improve manufacturing processes for nuclear weapon materials. These new technologies improve existing Building 9212 capabilities by shortening production schedules, reducing risks, and enhancing personnel safety. For example, casting operations in UPF will use microwave technology, replacing the current vacuum induction melt process in Building 9212. The installation and operation of systems moving to enduring facilities will allow for the current high-hazard processes for producing purified uranium metal, processing low equity material, and processing uranium chips/turnings, to be shut down.

The program supplies the current stockpile with purified enriched uranium metal, while supporting the transition of new capabilities (e.g., Microwave Casting, Electrorefining, and Direct Chip Melt) into the new and enduring facilities. The program also provides a comprehensive storage capability to support a steady supply stream of material through peak production periods.

Uranium Modernization is pursuing a services contract with a commercial vendor, Nuclear Fuel Services, for the conversion of oxide to purified metal to bridge an oxide-to-metal capability gap, provide risk reduction to NNSA during a period of significant technology transition at Y-12, and increase the resiliency and responsiveness of the program.

Uranium Modernization manages material inventories to maintain improved safety posture and optimize the composition of the inventory.

Depleted Uranium Modernization enables the restart of lapsed capabilities so NNSA can meet imminent weapons delivery mission requirements. These capabilities lapsed in the early 2000s due to the reuse of materials, low-demand signals, and prioritization of other activities. These capabilities include feedstock procurement, restarting and maintaining DU and DU-niobium alloying and manufacturing capabilities, and investing in key new technologies. The capability to produce, process, and handle depleted uranium supports several key missions within the nuclear security enterprise, from providing components for weapons modernization programs to the down-blending of HEU to low-enriched uranium.

DU modernization supports re-establishing a reliable supply of High Purity DU (HPDU) metal before the current inventory is exhausted in FY 2030. The program has initiated a DOE O 413.3B project entitled Depleted Uranium Hexafluoride (DUF6) to Depleted Uranium Tetrafluoride (DUF4) HPDU Conversion that will close the current gap in conversion capabilities for HPDU. The program is maintaining and restarting existing DU operations and DU-niobium (binary) alloying capabilities to meet current and future weapon component needs. To produce new binary ingots, Y-12 will need to restart the Vacuum Induction Melt (VIM) – Vacuum Arc Remelt (VAR) – VAR production process (VIM- VAR- VAR). The program is modernizing the wrought manufacturing and machining capabilities needed for component manufacturing as part of a bridging strategy to increase capacity and reliability in existing aging facilities to meet mission deliverables through 2035. At the request of the DU modernization program, the Office of Program Analysis and Evaluation completed a planning study in FY 2021 to evaluate solutions to fulfil mission need. The results of the study enabled the program to begin planning for the Agile Radiation Case and Component Capability (ARC), formerly the Depleted Uranium Manufacturing Complex (DUMC). ARC will deploy a new depleted uranium component manufacturing capability and replace the aging facilities currently in operation at Y-12, improve Y-12's ability to safely perform mission critical work in a modern facility, and increase production output to meet mission demand. Planning is underway to evaluate options and develop a phased, modular approach to alleviate known capacity issues, replace deteriorating infrastructure, and deploy technologies to improve highly inefficient processes. Lastly, DU modernization will train operators, develop procedures, and assist with process qualification activities at LANL and LLNL.

The program is investing in key new technologies to modernize production and meet future demands. DU modernization is accelerating the timeline to production insertion by forming multi-site technology readiness teams with key development and production personnel. Direct Casting would improve the existing component manufacturing process by significantly reducing the risks of current equipment failure, reducing material waste, and improving process efficiency. The program is also pursuing other technologies to provide additional opportunities for material reuse and recycling to reduce mission risk, such as Electron Beam Cold Hearth Melting (CHM). DU modernization is exploring Additive Manufacturing to quickly adapt to shifting production requirements and to eliminate expensive tooling. These new technologies could improve the DU-niobium alloying process as well as the production of DU and binary components.

Lithium Modernization enables the restart of previously shut down capabilities so NNSA can meet near term weapons material requirements. These capabilities were shut down in the 2010s due to extreme facility degradation, the qualification of a less corrosive recycle process, Direct Material Manufacturing (DMM), and the prioritization of other activities. Through the restart of chemical purification processes and metal production processes the program provides a reliable lithium material inventory supplemented by dismantling and recycling lithium components able to meet yearly material requirements.

The program plans and executes additional recapitalization projects and risk reduction activities to ensure that the current lithium processing capability is sustained until the establishment of the enduring future capability, the Lithium Processing Facility (LPF) is operational in the 2030s. These efforts provide the time and space needed to meet near term material deliverables while the LPF is designed and constructed.

The LPF is a first of its kind facility for the Nuclear Security Enterprise (NSE) that will be found at the former Biology complex site on Y-12. This facility will relocate lithium operations and processes currently in Buildings 9204-2 and 9202 into a safe, reliable, modern building. It will be designed with space for lithium processing equipment, shipping and receiving areas, in-process storage areas, and technical and administrative support areas. In FY 2024, the LPF will execute CD-3A for the long-lead procurement scope and site preparation. Long-lead procurements are critical equipment such as lathes, mills, and presses. Site preparation work includes demolition of slabs and underground utilities; removal of unsuitable soils and backfill; and installation of site access controls, water drainage features, retention basins, and temporary facilities.

The program also makes high-return investments in key new technology maturation efforts and process improvements that make lithium processing more efficient, safer for workers, and less impactful to surrounding infrastructure. In FY 2024, the Lithium Modernization program will continue to pursue these activities through cross cutting technology exploration with key partnerships at LANL, LLNL, and PNNL. A secondary goal of these efforts is to increase lithium processing development and expertise by building the enterprise's future Lithium material SMEs across design and production agencies.

Special Materials provides funding to develop and deploy a new modern production capability for new component technologies that will be used in all future weapons. In the late 2000s, the NNSA discontinued the legacy process used to produce certain components due to safety concerns. These legacy materials will be replaced with new technologies that will utilize materials that meet the performance requirements and are less hazardous to use. There is no existing capability to produce Special Materials components within the Nuclear Security Enterprise, which is one of the NNSA Defense Program's top risks.

In 2019, NNSA awarded Y-12 the Special Materials mission assignment to stand up a modern manufacturing capability to meet critical near-term system deliverables that is also sufficient and flexible enough to support all future weapon systems. Special Materials supports Y-12's plan to repurpose its existing Building 9225-03 into the future Special Materials Facility which will serve as the long-term manufacturing hub for Special Materials components. Special Materials also supports establishing a near-term production capability at the Test and Demonstration Facility to meet imminent weapons delivery mission requirements.

The program also supports the maturation of the selected technologies and the development of a flexible manufacturing process. Multiple sites across the Nuclear Security Enterprise, including LANL, LLNL, KCNSC, and PNNL, are partnering with Y-12 in research and development for this mission. In FY 2024, the Special Materials program will continue to support technology maturation work to mature the Special Materials technologies to the next technology readiness milestones.

In addition to the existing subprograms, NNSA identified new modernization requirements to meet future mission requirements. The emerging **Secondary Capability** cross-cutting requirements include scope needed to support a robust, flexible and responsive nuclear security enterprise. Based on strategic modeling of needed future capacity, NNSA is planning to upgrade and invest in several capabilities at Y-12 that support these needs. Secondary Capability Modernization will support, in concert with the NNSA Office of Infrastructure, the relocation of Y-12's Development capability. Y-12 Development supports Y-12's production mission to develop new technologies, address production issues, and support the global security mission. Additionally, the General Manufacturing capability in building 9201-1 requires modernization to support the fabrication of components. The technology development and general manufacturing tie into the Assembly, Disassembly, Dismantlement and Surveillance (ADDS) capability, in Building 9204-2E, which will require modernization to meet future capacity needs. Finally, Quality Modernization, which includes Analytical Chemistry Operations currently housed in Building 9995, the Y-12 Plant Lab, requires urgent modernization. Due to the aging facility, analytical chemistry operations and sampling are impacted by unplanned outages due to the facility's condition and will require increased capacity to meet future demand. The program is pursuing opportunities to reduce risk to the supply chain needed to maintain the stockpile. The Critical Supplier Initiative broadly addresses critical supply chain concerns and supports the subprograms.

Highlights of the FY 2024 Budget Request

- Continue activities that will allow NNSA to phase out mission dependency on Building 9212 by supporting the transition of enriched uranium capabilities into existing facilities and UPF and deactivating out-of-service systems in Building 9212. Activities include the following:
  - Receive startup authorization for the calciner in Building 9212 to process low-equity uranium solutions and begin operating the electrorefining capability in Building 9215 to purify uranium metal.
  - Conclude pre-operational testing and transition the direct chip melt front loading furnace to production in Building 9215 and advance the direct chip melt bottom loading furnace project.
  - Reestablish a uranium oxide-to-metal conversion capability.
- Maintain working inventory levels of material to reduce safety and security risks in enduring facilities and optimize the material composition of the uranium inventory.
- Continue to implement a strategy to optimize limited space in enriched uranium facilities.
- Develop, sustain, and increase the reliability of uranium analytical and manufacturing capabilities to reduce risks.
- Extend the operational life of enduring enriched uranium facilities.
- Reduce material inventory, deactivate systems, and process and disposition of legacy materials to phase out mission dependency on Building 9212.
- Install newly procured equipment as part of the DU bridging strategy to mitigate risks associated with the aging material and component processes at Y-12.
- Startup critical VIM-VAR-VAR and wrought capabilities to support current and future weapon systems.
- As part of the DU Bridging Strategy, execute DU foundry modernization projects supporting binary production (e.g., 2nd VAR, Nitric Acid Tank, Swager).
- Accelerate technology development schedule for future insertion into production to reduce reliance on aging material and component processes, reduce material demands, and improve binary production efficiency. Technologies include Direct Cast, Cold Hearth Melting, and Additive Manufacturing.
- Invest in DU storage capabilities and material modeling to ensure the long-term availability of strategic materials.
- Begin planning activities for the ARCCC project.
- Produce and maintain the lithium material supply to meet the Defense Program (DP) mission and customer deliverables, including the maintenance of a configuration-controlled lithium supply and demand model.
- Continue to reestablish conversion and purification capabilities in support of near-term mission requirements.
- Maintain and recapitalize program equipment to reduce the risk of single-point failures.
- Mature lithium technology alternatives for future deployment to improve processing efficiencies in support of the Lithium Strategy.
- Install the Special Materials prototype production press at the Y-12 Test and Demonstration Facility.
- Continue to mature both Special Materials technologies to reach the next technology readiness level milestones.
- Initiate procurement of engineered equipment that will be installed at Y-12's Special Materials Facility.
- Support the relocation of Y-12 Development to ensure facility needs are identified in concert with the Office of Infrastructure.
- Develop a General Manufacturing Modernization Program, update the graphite strategy, update the 9201-1 Facility modernization Plan, and support production modernization of general manufacturing with a large vertical turning lathe.
- Undertake a gap analysis to determine the scope of the modernization required for Y-12 Assembly, Disassembly, Dismantlement and Surveillance capability.
- Establish a Quality Modernization program, continue the Extended Life Program work in Building 9995 and address urgent needs to increase capacity through modern equipment.

FY 2025 – FY 2028 Key Milestones

- Initiate work to fabricate and install equipment in Building 9215 to expand the chip processing capacity.
- Advance the direct electrolytic reduction technology, which, with the electrorefining process, will provide the capability to convert uranium oxide to purified metal at Y-12.
- Qualify the viability of casting enriched uranium parts using microwave technology, which is efficient and will improve the quality of the enriched uranium metal supply.

- Maintain Target Working Inventory, the minimum amount needed, within enduring facilities to enhance the safety of existing facilities that will be operational through the 2040s.
- Bridge the gap and reduce the risk of an oxide-to-metal conversion capability.
- Optimize quantity and quality of purified metal production.
- Update Y-12 facility capabilities to accommodate UPF needs.
- Establish a DUF6 to HPDU conversion capability to provide a reliable source for HPDU to meet mission requirements by FY 2028.
- Execute DU bridging strategy by installing an additional annealing furnace, additional lathes, and a second weld box to meet critical near-term mission requirements.
- Achieve Technical Readiness Level (TRL) 7 (Full-scale, similar system demonstrated in relevant environment) for Cold Hearth Melting.
- Install 1-2 Direct Cast VIM furnaces at Y-12 to meet additional demand.
- Implement investments as part of the DU bridging strategy to meet mission requirements through 2035.
- Increase storage capacities to provide a steady supply stream of material during peak production periods.
- Install an additional capacity Crusher Grinder equipment to eliminate a critical path single point of failure in the lithium material stream.
- Ramp up staffing to support the transition to LPF from Building 9204-2.
- Begin lithium process transitions in support of a future operational release plan to transition lithium operations to the LPF and reduce lithium mission reliance on Building 9204-2.
- Achieve Beneficial Occupancy in the Special Materials Facility at Y-12.
- Install and start-up engineered equipment at the Special Materials Facility at Y-12.
- Reach technology readiness milestones for both Special Materials technologies.
- Design/fabricate and start up the second press in support of the long-term capability at the Special Materials Facility.
- Begin producing Special Materials components to meet imminent weapons delivery milestones such as production prove-in and starting qualification.

FY 2022 Accomplishments

- Produced eleven production quality buttons of purified metal utilizing the Electrorefining Development Glovebox system.
- Executed phase I of a uranium oxide purification and conversion contract with a commercial vendor designed to bridge an upcoming capability gap and reduce risk to the uranium program.
- Demonstrated repeatability of microwave casting technology using UPF microwave casting furnaces prototype.
- Removed 10 pieces of out-of-service equipment in the enriched uranium production area to improve the flexibility and resiliency of operations.
- Deactivated 14 out-of-service systems to prepare for transitioning operations out of facilities, including Building 9212.
- Conducted relevant analyses in support of the physics and engineering qualification for Direct Cast components, which is an important step in implementing the Bridging Strategy.
- Published a joint LLNL and LANL Binary Ingot Qualification Plan in support of VIM-VAR-VAR restart activities at Y-12, allowing the labs to have one specification for all weapon systems.
- Restarted LANL's development of the VAR furnace to enable the manufacture of development binary ingots, alleviating the risk of binary production and usage at Y-12.
- Completed engineering assessments of Direct Cast binary, accelerating technology development for Direct Cast components.
- Commissioned the Cold Hearth Electron Beam Melting Cold Hearth Melting for future binary recycling and alloying, supporting the advancement of its technology readiness level.
- Production weld box was made operational, facilitating future VAR activities.
- Initiated welding activities for 1st production of VAR melts.
- Provided five binary ingots to Stockpile Programs with a prototype VAR to support manufacturability, certification, and tests needed to inform Phase 6 weapons development.
- Completed installation and site acceptance testing of Direct Cast furnace to support the advancement of technology and manufacturing readiness levels.

- Released Y-12 Depleted Uranium Bridging Strategy which evaluated interim processing options and developed a plan to meet stockpile requirements until the future ARCCC is available.
- Completed first lithium metal campaign in 10 plus years in support of DoD deliverables.
- Updated and validated the Lithium supply and demand model to inform future investments and ensure an adequate lithium supply.
- Completed restart of select lithium salvage operations to reclaim lithium from consumable materials before disposition.
- Migrated Lithium Integrated Master Schedule to the classified system to better integrate and prioritize investments with weapons delivery dates.
- Completed Lithium Crystallization and Material Conversion and Equipment Refurbishment (MCER) recapitalization projects required to supply lithium materials for near-term weapons deliverables.
- Updated Lithium Infrastructure Implementation Plan for recapitalization and risk reduction for the aging Building 9204-2.
- Successfully completed technology transfer for one of the Special Materials technologies from the Design Agency to the Y-12.
- Reached technology readiness milestones on both Special Materials technologies.
- Revised capacity models and analyses for Special Materials with updated test data.
- Initiated the RFP for the Special Materials prototype production press early to help mitigate supply chain risk.
- Completed a schedule risk analysis for Special Materials and incorporated the results into the Integrated Master Schedule.

Secondary Capability Modernization

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Secondary Capability Modernization $536,363,000	**Secondary Capability Modernization $666,914,000**	**Secondary Capability Modernization +$130,551,000**
• Continue activities that will allow NNSA to phase out mission dependency on Building 9212 by supporting the transition of enriched uranium capabilities into existing and new-build facilities. • Complete pre-operational testing for the calciner in Building 9212 to process low-equity uranium solutions and begin operational release of the electrorefining capability in Building 9215 to purify uranium metal. • Continue development and execution of direct chip melt bottom-loading furnace to process machine turnings. • Continue efforts to reestablish a uranium oxide-to-metal conversion capability and optimize metal supply. • Continue material optimization efforts to reduce safety and security risks. • Improve existing manufacturing capabilities and optimize floor space for flexible production capacity in enriched uranium facilities. • Extend the operational life of enduring enriched uranium facilities. • Continue purified metal production. • Deactivate systems and processing and disposition of legacy materials to phase out mission dependency on Building 9212. • Improve HEU feedstock quality before and during the transition to the new and enduring facilities.	• Continue activities that will allow NNSA to phase out mission dependency on Building 9212 by supporting the transition of enriched uranium capabilities into existing and new-build facilities and deactivating out-of-service systems in Building 9212. • Continue development and execution of direct chip melt bottom-loading furnace to process machine turnings. • Continue efforts to reestablish a uranium oxide-to-metal conversion capability and optimize metal supply. • Extend the operational life of enduring enriched uranium facilities. • Continue purified metal production. • Improve HEU feedstock quality before and during the transition to the new and enduring facilities. • Continue to execute the high-priority Special Materials mission at Y-12 to establish a new production capability and produce Special Material components to meet mission requirements. • Continue activities that will re-establish high-purity depleted uranium (HPDU) feedstock supply capability to support enduring mission requirements and sustain and modernize DU alloying and component production capabilities to meet critical mission requirements. • Develop and deploy new technologies further, such as Direct Cast and Cold Hearth Melting, to	• Increase reflects planned investments in critical DU modernization projects (DU Feedstock Supply & Procurement, Binary Production), uranium modernization projects, special materials planned investments. In addition, the increase reflects emerging mission demands (including Assembly, Disassembly, Dismantlement and Surveillance (ADDS)and Quality Modernization supporting urgent modernization of the Y-12 Plant Lab in Building 9995). Lastly, the increase reflects the ramping up of special materials activities.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Downselect a path forward to establish a reliable supply of HPDU metal feedstock to meet mission requirements. • Produce binary ingots and test hardware and components with the newly restarted VIM-VAR-VAR and wrought capabilities to support current and future weapon systems. • Develop and deploy new technologies further, such as Direct Cast and Cold Hearth Melting, to improve alloying and component production efficiencies. • Establish more DU storage capabilities and conduct material modeling with new technology assumptions to ensure the long-term availability of strategic materials. • Install newly procured equipment as part of the DU bridging strategy to mitigate risks associated with the aging material and component processes at Y-12. • Planning activities for the ARCCC project. • Plan rapid response processes for most likely operational failure modes. • Process LiH and LiD in support of deliverables. • Plan and begin execution of Lithium Lab Area Upgrades project in support of requirements. • Complete installation of the additional evaporator (Bird Bath). • Begin design and execution of the Backup Crusher/Grinder project. • Plan and prioritize activities in the Lithium Process Equipment Relocation risk reduction activity. • Plan rapid response processes for most likely operational failure modes.	improve alloying and component production efficiencies. • Continue activities that will re-establish purification and conversion capabilities and prioritize, plan, and execute recapitalization and risk reduction activities to sustain current capability until LPF is operational. • Continue design and execution of the Backup Crusher/Grinder project. • Recapitalize lithium process equipment.	

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
18-D-690 Lithium Processing Facility, Y-12 ***$216,886,000***	***18-D-690 Lithium Processing Facility, Y-12*** ***$210,770,000***	***18-D-690 Lithium Processing Facility, Y-12*** ***-$6,116,000***
• Achieve CD-3A to authorize long lead procurements and site prep. • Continue to mature process design work. • Continue to mature facility design work. • Begin fabrication of TRL 7 prototype for homogenization (HMG) technology, in support of TRL 7 testing, a new technology for LPF that will improve material health.	• Execute long lead procurement, CD-3A, and fabrication contracts such as Crusher Grinder, Isostatic Press, and Machining Mill and Lathe complexes. • Execute site preparation, CD-3A, contract. • Continue to mature process design and facility design towards 90%. • Execute HMG TRL 7 testing and assessment in support of CD 2/3 project milestone.	• Decrease reflects use of carryover to support execution of CD-3A scope while keeping the project on schedule and within the CD-1 cost range.
06-D-141 Uranium Processing Facility, Y-12 ***$362,000,000***	***06-D-141 Uranium Processing Facility, Y-12*** ***$760,000,000***	***06-D-141 Uranium Processing Facility, Y-12*** ***+$398,000,000***
• Execute contracts for the specialized equipment and bulk commodities needed for ongoing nuclear facility construction, leases, and incremental commitments to previously awarded contracts to support progress on UPF. • Continue construction for the Main Process Building, Salvage and Accountability Building, and Process Support Facility. • Begin startup testing and commissioning activities on the Main Process Building, Salvage and Accountability Building, and Process Support Facility.	• Execute contracts for the specialized equipment and bulk commodities needed for ongoing nuclear facility construction, leases, and incremental commitments to previously awarded contracts to support progress on UPF. • Continue construction for the Main Process Building and Salvage and Accountability Building.	• Increase supports execution of construction, startup testing, and commissioning activities for the Main Process Building, Salvage and Accountability Building, and Process Support Facility.

Production Modernization
Tritium and Domestic Uranium Enrichment

Overview

The Tritium Modernization and Domestic Uranium Enrichment (DUE) program is responsible for producing tritium and supplying unobligated low-enriched uranium to support national security needs. The program includes (1) Tritium Modernization and (2) Domestic Uranium Enrichment.

The Tritium Sustainment and Modernization program operates the national capability for producing tritium. The Tritium supply chain's capacity is increasing as part of a multi-year plan to reliably meet national security requirements. NNSA is producing tritium by irradiating TPBARs in two TVA reactors during normal 18-month operating cycles. Tritium is extracted from the TPBARs at the Tritium Extraction Facility (TEF) at SRS. The tritium inventory is required to meet national security requirements, including support for limited-life component exchanges of tritium reservoirs that are deployed in the stockpile. The program establishes tritium production schedules, based on detailed computational models and annual tritium reconciliations, that maintain required tritium inventories, including reserve quantities. Production planning takes into consideration the material that is constantly being recovered and recycled from deployed reservoirs, including those from weapon dismantlements. The program also supports tritium science, technology, and development to maintain a reliable tritium supply chain.

The Domestic Uranium Enrichment program is responsible for ensuring a reliable supply of enriched uranium to support U.S. national security needs. Since the closure of the Paducah Gaseous Diffusion Plant in 2013, the United States has lacked the capability to produce enriched uranium free of peaceful use obligations (i.e., unobligated). DOE/NNSA requires unobligated enriched uranium to fuel reactors that produce tritium for nuclear weapons and to power the nuclear Navy. The DUE program is implementing a three-pronged strategy to supply current enriched uranium needs and re-establish a supply of enriched uranium to meet long-term needs. First, NNSA seeks to ensure and extend availability of its unobligated LEU fuel supply through the early 2040s by down-blending excess HEU. Second, DUE is preserving and advancing uranium enrichment expertise and technology to meet current and future U.S. Government needs. Third, DUE is executing the acquisition process to re-establish a long-term supply of enriched uranium to support future U.S. national security needs.

Domestic Uranium Enrichment activities include the following:

1. Manage Departmental uranium inventories to support tritium production, including down-blending of excess HEU.
2. Preserve and advance uranium enrichment expertise and technology, including conceptual design activities for a potential small centrifuge pilot plant.
3. Leverage the Office of Nuclear Energy's plan to procure high-assay low-enriched uranium from industry to support defense needs.
4. Execute the acquisition process to deploy a domestic uranium enrichment capability.

Tritium and Domestic Uranium Enrichment

The Tritium Finishing Facility (TFF) at the Savannah River Site recapitalizes tritium infrastructure that supports scheduled shipments of gas transfer systems to the Department of Defense. To maintain the nuclear security enterprise's capacity to execute existing construction projects and to ensure design resources and critical personnel are available to the SRPPF project, no funding is requested for TFF in FY 2024. . Carryover will be used to bring design to 30% complete and to execute the site prep subproject. NNSA will monitor the condition of existing infrastructure and invest, where necessary, to reduce risk and avoid disruption of Department of Defense schedules.

Highlights of the FY 2024 Budget Request
- Execute additional component procurements and TPBAR assemblies to satisfy increased production requirements.
- Continue irradiation of 1,792 TPBARs in WBN1 Cycle 19, complete irradiation of 1,104 TPBARs in WBN2 Cycle 5, and commence irradiation of 1,680 TPBARs in WBN2 Cycle 6.
- Proceed with the implementation of tritium production assurance, including advanced mitigation planning for extended reactor outages.
- Conduct seven extractions at the Tritium Extraction Facility (TEF), continuing the ramp-up to full operations mode.
- Maintain a purified tritium supply and enable the delivery of tritium for national security needs.
- Disposition of helium-3 byproduct for U.S. Government needs.
- Execute process system sustainment plan (PSSP) to refurbish or replace tritium processing equipment.
- Execute research and development (R&D) activities supporting extraction, recycle and recovery, risk mitigation activities, and technology maturation efforts.
- Continue procurement and design activities for the Hot and Cold Nitrogen and Thermal Cycling Absorption Process Projects.
- Continue down-blending of HEU from existing excess uranium inventory to provide LEU fuel for tritium production.
- Continue to seek and secure additional sources of unobligated enriched uranium to fuel tritium production.
- Preserve and advance uranium enrichment expertise and technology for current and future U.S. national security needs through the Domestic Uranium Enrichment Centrifuge Experiment (DUECE) centrifuge development program.
- Leverage the Office of Nuclear Energy's plan to procure high-assay low-enriched uranium from industry to support defense needs.
- Begin planning and conceptual design activities for DUE Pilot Plant.

FY 2025 – FY 2028 Key Milestones
- Fabricate and deliver ~11,000 TPBARs to TVA.
- TVA irradiates ~11,000 TPBARs in both WBN1 and WBN2.
- Complete ~43 shipments of irradiated TPBARs to the TEF.
- Complete ~28 extractions at TEF (~11K TPBARs).
- Invest in measures to increase confidence in the tritium supply chain.
- Increase production to 3,300 grams of tritium over an 18-month reactor cycle by 2025.
- Deliver high-capacity transportation casks in FY 2025.
- Maintain a purified tritium supply and enable the delivery of tritium for national security needs.
- Disposition of helium-3 byproduct for U.S. Government needs.
- Support Weapons Engineering Tritium Facility (WETF) de-inventory mission at LANL.
- Execute process system sustainment plan (PSSP) to refurbish or replace tritium processing equipment.
- Complete HCN/TCAP project procurement and design activities and execute equipment replacements in CY 2025 outage.
- Complete down-blending campaign to provide additional LEU fuel for tritium production.
- Perform final down-select for a domestic uranium enrichment technology in the mid-2020s.
- Begin operating engineering scale DCAS 2 cascade at Oak Ridge National Laboratory.
- Manage TFF risks and plan for restart of the TFF project.

FY 2022 Accomplishments
- Completed irradiation of 544 TPBARs in Cycle 4 and commenced irradiation of 1,104 TPBARs in Cycle 5.

- Completed two shipments of TPBARs to TEF.
- Completed two extractions of 300 TPBARs per extraction at the TEF, awarded contracts for three waste containers, and dispositioned four extracted consolidation containers.
- Led Tritium Science Program studies at multiple DOE laboratories.
- Recovered and recycled tritium to meet NNSA requirements and managed helium-3 byproduct to not impact Gas Transfer System mission.
- Prepared and approved design performance baseline change proposal to develop a cost and schedule plan for the TFF.
- Completed Inert Loading 30% Design for TFF.
- Approved TFF Preliminary Consolidated Hazards Analysis Report.
- Initiated preliminary design activities for TFF process buildings.
- Continued down-blending campaign, providing unobligated LEU for tritium production.
- Secured additional unobligated LEU held at the Portsmouth, OH cleanup site, which provided an additional 1.5 reloads and, when combined with the ongoing down-blending campaign, extended the need date for LEU fuel for tritium production to 2044.
- Began construction of the facility that will house the engineering-scale cascade, DCAS2, which will demonstrate performance, packing density, and machine reliability of the DUECE small centrifuge.
- Successfully completed single machine testing of a DUECE small centrifuge design which could meet NNSA's performance requirements.

Tritium and Domestic Uranium Enrichment

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Tritium and Domestic Uranium Enrichment $506,649,000	**Tritium and Domestic Uranium Enrichment $592,992,000**	**Tritium and Domestic Uranium Enrichment +$86,343,000**
• Execute additional component procurements and TPBAR assemblies to satisfy increased production requirements. • Complete irradiation of 1,792 TPBARs in WBN1 Cycle 18, and 1104 TPBARs in WBN2 Cycle 5. • Complete fabrication of 1,792 TPBARs for WBN1 Cycle 19 and 1600 TPBARs for WBN2 Cycle 6. • Proceed with implementation of tritium production assurance, including advanced mitigation planning for extended reactor outages. • Commence WBN1 Cycle 19 TPBAR Irradiation. • Conduct eleven TPBAR shipments to the TEF. Ship low-level hardware waste to NNSS. • Conduct six extractions at the Tritium Extraction Facility (TEF), beginning the ramp-up to full operations mode. • Maintain a purified tritium supply and enable delivery of tritium for national security needs. • Disposition helium-3 byproduct for U.S. Government needs. • Execute process system sustainment plan (PSSP) to refurbish or replace tritium processing equipment. • Execute research and development (R&D) activities supporting extraction, recycle and recovery, risk mitigation activities, and technology maturation efforts. • Continue long-lead procurements and design activities for the six HCN/TCAP projects.	• Execute additional component procurements and TPBAR assemblies to satisfy increased production requirements. • Continue irradiation of 1,792 TPBARs in WBN1 Cycle 19, and complete irradiation of 1,104 TPBARs in WBN2 Cycle 5. • Complete fabrication of TPBARs for WBN2 Cycle 6. • Proceed with implementation of tritium production assurance, including advanced mitigation planning for extended reactor outages. • Conduct four TPBAR shipments to the TEF. Ship low-level hardware waste to NNSS. • Conduct seven extractions at the Tritium Extraction Facility (TEF), continuing the ramp-up to full operations mode. • Maintain a purified tritium supply and enable delivery of tritium for national security needs. • Disposition helium-3 byproduct for U.S. Government needs. • Execute process system sustainment plan (PSSP) to refurbish or replace tritium processing equipment. • Execute research and development (R&D) activities supporting extraction, recycle and recovery, risk mitigation activities, and technology maturation efforts.	• Increase for DUE reflects DUECE project beginning procurement activities for machines for DCAS2. • Increase for DUE to initiate activities to leverage the Office of Nuclear Energy's plan to procure high-assay low-enriched uranium from industry to support defense needs. • Increase for DUE is due to the start of conceptual design activities for a DUE Pilot Plant.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Continue down-blending campaign to extend the need date for LEU fuel for tritium production. • Continue to seek and secure additional sources of unobligated enriched uranium to support the tritium production mission. • Continue to preserve and advance uranium enrichment expertise and technology to meet current and future U.S. Government needs. • Begin design activities for an enrichment technology pilot plant, if appropriate. • Complete DUECE Demonstration Cascade 2 (DCAS2) Minor Construction project at ORNL.	• Continue long-lead procurements and design activities for the six HCN/TCAP projects. • Continue down-blending campaign to extend the need date for LEU fuel for tritium production. • Continue to seek and secure additional sources of unobligated enriched uranium to support the tritium production mission. • Continue to preserve and advance uranium enrichment expertise and technology to meet current and future U.S. Government needs. • Begin procurement activities for DUECE machines in engineering scale demonstration cascade DCAS2. • Begin TRL manufacturing maturation and equipment purchases • Initiate activities to leverage the Office of Nuclear Energy's plan to procure high-assay low-enriched uranium from industry to support defense needs. • Begin conceptual design activities for enrichment technology pilot plant. •	
18-D-650 Tritium Finishing Facility, SRNS ***$73,300,000***	***18-D-650 Tritium Finishing Facility, SRNS*** ***$0***	***18-D-650 Tritium Finishing Facility, SRNS*** ***-$73,300,000***
• Manage execution risks and maintain progress on site preparation and TFF design.	• No funding requested.	• Decrease reflects reprioritization across the Production Modernization construction portfolio, recognizing the nuclear security enterprise's capacity to execute construction and maintaining a focus on finishing projects currently under construction

Production Modernization
Non-Nuclear Capability Modernization

Description

The Non-Nuclear Capability Modernization (NNCM) program executes projects to ensure the enduring availability of non-nuclear capabilities for multiple weapon systems. The NNCM program is responsible for all non-nuclear components external to the primary or secondary stage in the nuclear explosive package (NEP). Non-nuclear components enable critical functionality in the warhead including arming, fuzing, and firing, key safety and use control features, and other vital functions. Providing these functions requires a wide range of components encompassing radiation-hardened microelectronics, neutron generators, gas transfer systems, power sources, electrical assemblies, cables, connectors, structural elements, pads/cushions, and a multitude of other parts that are incorporated into the systems that support or weaponize the NEP. The NNCM program modernizes the extensive suite of infrastructure and equipment required to support the non-nuclear component lifecycle inclusive of design, development, qualification, production, and surveillance. These capabilities ensure that components can survive environments encountered throughout the stockpile to the target sequence and over the life of the weapon.

Non-Nuclear Capability Modernization activities include the following:

1. Procure equipment to meet non-nuclear component manufacturing capacity requirements.
2. Provide equipment and infrastructure to enable new technology insertion.
3. Sustain NNSA's capability to produce trusted microelectronics.
4. Recapitalize and conduct equipment maintenance on critical environmental tests and accelerator capabilities that support lifecycle activities for weapon electrical and mechanical systems.
5. Procure equipment that supports the bridging strategy for Power Sources production capabilities.
6. Introduce new processes and technologies that increase efficiency in component manufacturing.
7. Procure equipment for the front-end assurance system for electronic components to reduce the risk of inserting commercial-off-the-shelf (COTS) parts during weapon modernization programs.
8. Mitigate industrial base and supply chain risks for non-nuclear parts by providing supply chain monitoring tools, commodity analysis, and new vendor development support.
9. Identify and monitor materials used in nuclear weapons that are at risk of obsolescence, discontinuation, scarceness, unavailability, or usability issues.
10. Execute planning and OPC activities to modernize production capabilities for non-nuclear components through line items including the Power Sources Capability (PSC), Next Generation (NextGen), and Microelectronic Components Capability (MC2, formerly the Heterogenous Integration Facility) projects.
11. Execute planning and OPC activities to modernize production capabilities for non-nuclear components through line items including the Power Sources Capability (PSC), Next Generation Component Research & Development Facility (NextGen), and Microelectronic Components Capability (MC2, formerly the Heterogenous Integration Facility) projects.
12. Develop production modernization strategies for material staging and warhead assembly operations at PX.

Highlights of the FY 2024 Budget Request

- Expand KCNSC manufacturing capacity to meet program of record (PoR) production requirements.
- Procure fabrication tools and equipment to enable continued manufacturing of trusted strategic radiation hardened (TSRH) microsystems at the MESA complex for the nuclear weapon stockpile.
- Refurbish SNL's ACRR radiation testing facility, which is critical for the qualification and surveillance testing of all weapons systems.
- Continue implementing a front-end assurance system model for electronic COTS parts to reduce risk in weapons modernization programs.
- Procure production tools and equipment to enable the manufacturing of Neutron Generators for the nuclear weapons stockpile.
- Develop thermal spray production capability needed to meet the requirements of modernization systems.
- Continue strategic sourcing mitigations targeting distressed commodities and vendors and implement commodity strategies that reduce overall supply chain risks.
- Continue implementation of an enterprise-wide effort for early identification of at-risk materials and development of solutions to mitigate supply chain interruptions.

- Continue programmatic equipment acquisition and maintenance for Accelerators (including SATURN and HERMES), Major Environmental Test Facilities (METF), and Electrical Sciences at SNL.

FY 2025 – FY 2028 Key Milestones
- Complete KCNSC short-term expansion plan, FY 2028.
- Achieve CD-2/3 for Power Sources Capability, FY 2025.
- Complete equipment outfitting for first phases of KCNSC long-term expansion plan, 2028.

FY 2022 Accomplishments
- Supported KCNSC manufacturing capacity expansion to meet PoR production requirements to 2028.
- Procured fabrication tools and equipment to enable continued manufacturing of trusted strategic radiation hardened (TSRH) microsystems at the MESA complex for the nuclear weapon stockpile.
- Continued refurbishment of SNL's SATURN X-Ray effects testing capabilities, which are critical to ensuring that non-nuclear components can survive the Stockpile to Target Sequence environments.
- Implemented a front-end assurance system model for electronic parts to reduce the risk of inserting COTS during weapons modernization programs.
- Initiated thermal spray production capability needed for future systems.
- Supported establishing a university-led Center of Excellence to focus on developing new additive and advanced manufacturing techniques, technologies, and methodologies to evaluate diagnose, and control materials for production and manufacturing purposes.

Non-Nuclear Capability Modernization

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Non-Nuclear Capability Modernization $123,084,000	**Non-Nuclear Capability Modernization $166,990,000**	**Non-Nuclear Capability Modernization +$43,906,000**
• Expand manufacturing capability at KCNSC to address increased capacity needs for PoR requirements to 2028. • Fund OPCs for PSC and MC2 projects. • Development of thermal spray production capability for modernization programs. • Modernize environmental testing, power source development, and trusted radiation-hardened microelectronics capabilities at SNL. • Fund the inclusion of Accelerator, METF, and Electrical Sciences programmatic equipment maintenance and procurement requirements at SNL. • Procure equipment for the front-end assurance system for electronic COTS parts. • Support modernization efforts for the radiation testing facility at SNL (ACRR). • Implement the Tester Transformation Initiative to establish a means for pre-qualifying testers to a common DA/PA platform. • Procure production tools and equipment to enable continued manufacturing of Neutron Generators for the nuclear weapons stockpile. • Implement an enterprise-wide approach to identify at-risk materials and mitigate supply chain interruptions. • Replace power sources programmatic equipment beyond service life for use in Agile Facility and PSC.	• Continue expanding manufacturing capability at KCNSC to address increased capacity needs for PoR requirements to 2028. • Provide OPC funding to develop production modernization strategies for material staging and warhead assembly operations at Pantex and for the NextGen project Continue development of thermal spray production capability for modernization programs. • Continue to modernize environmental testing and trusted radiation-hardened microelectronics capabilities at SNL. • Continue the Accelerator, METF, and Electrical Sciences programmatic equipment maintenance and procurement requirements at SNL. • Continue sustainment of the front-end assurance system for COTS parts. • Support for modernization efforts for the radiation testing facility at SNL (ACRR). • Continue implementation of the Tester Transformation Initiative to establish a means for pre-qualifying testers to a common DA/PA platform. • Continue procuring production tools and equipment to enable manufacturing of Neutron Generators for the nuclear weapons stockpile. • Continue implementation of an enterprise-wide approach to identify at-risk materials and mitigate supply chain interruptions.	• Increased support for KCNSC expansion efforts. • Increased support for trusted radiation-hardened microelectronics capabilities at SNL.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Continue the Pantex Modernization Study to develop a plan for modernizing the Pantex Plant. • Undertake studies of process improvements to reduce manufacturing costs across the enterprise.	• Continue studies of process improvements to reduce manufacturing costs across the enterprise.	
22-D-513, Power Sources Capability, SNL $0	***22-D-513, Power Sources Capability, SNL $37,886,000***	***22-D-513, Power Sources Capability, SNL +$37,886,000***
• Project zeroed in FY 2023 to incorporate value engineering recommendations from FY 2022.	• Execute project preliminary design and other post-CD-1 efforts.	• Increase aligns with a return to execution for the SNL PSC project after completing value engineering efforts on the original conceptual design.

Production Modernization
Capability Based Investments

Description

The Capability Based Investments (CBI) program executes projects to replace or enhance core enterprise capabilities through the recapitalization of high-risk of failure tests, measurements, and production equipment. CBI addresses enduring, multi-program requirements through discrete, short-duration projects. These investments recapitalize scientific and manufacturing capabilities that have degraded due to aging, broken, or outdated equipment and supporting systems. CBI activities primarily include capital equipment purchases and minor construction projects that enable the installation and use of the equipment and associated capabilities. These investments address needs beyond any single facility, campaign, or weapon system and are essential to achieving DP mission objectives. The CBI portfolio provides agility and reduces programmatic risk to mission across the nuclear security enterprise and ensures needed capabilities are available for stockpile stewardship, sustainment, and modernization.

Highlights of the FY 2024 Budget Request

- Table I shows the planned CBI projects to be executed with FY 2024 funding based on the status of enterprise infrastructure as of March 2023. This plan may need to be updated before the FY 2024 execution year to respond to changing infrastructure conditions and requirements.

FY 2025 – FY 2028 Key Milestones

- Meet current commitments that enable W80-4 and W87-1 modernization programs by FY 2025.
- Complete equipment replacement and refurb projects at LANL that support the roadmap to 30 pits per year.
- Modernize sub-critical testing capabilities used for stockpile assessment, NEP design, and weapon certification activities to support planned sub-crit schedules.

FY 2022 Accomplishments

- Replaced Lujan target to extend neutron research facility lifetime at LANSCE, LANL.
- Increased ultrasonic milling capacity to support modernization program schedule, Y12.
- Completed CBI scope supporting KCSTEP, KCNSC.
- Completed new DA/PA integrated Polymer Enclave, LLNL.
- Established a new Hard X-Ray (HXR) capability at the Stanford Synchrotron Radiation Lightsource (SSRL) facility to reconstitute a capability lost when NNSA transitioned out of the BNL NSLS II, NNSS.
- Provided Gen4 Multiplexed Photon Doppler Velocimetry (MPDV) to support stand up of Neutron Diagnostics for Subcritical Experiments (NDSE) Zeus test bed and Enhanced Capabilities for Subcritical Experiments (ECSE) Scorpius test bed, NNSS.

Capability Based Investments

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Capability Based Investments $154,220,000	**Capability Based Investments $156,462,000**	**Capability Based Investments +$2,242,000**
• CBI provides targeted, strategic investments for life-extension and modernization of enduring requirements needed to sustain Defense Programs' capabilities.	• Table I contains the current FY 2024 project plan as of March 2023CBI project funds are allocated in accordance with planned priorities but retain the flexibility to adjust efforts to address emerging changes in priorities and unplanned programmatic equipment failures.	• No significant change.

Table I

National Nuclear Security Administration Capability Based Investments Planned FY 2024 Recapitalization Projects - As of March 2023		
Site	**Project Name**	**FY 2024 Allocation ($K)**
KCNSC	Development Laboratory Modernization	1,200
	Special Application Machining Modernization	2,000
	Gas Transfer Systems Production Modernization	500
	Rubber & Plastics Modernization	800
	Analytical Laboratory Modernization	1,000
	Assembly and Electrical Fabrication Modernization	2,500
Subtotal, Kansas City National Security Campus		**8,000**
LLNL	Applied Material Engineering (AME) Consolidation	14,270
	Detonation and Dynamic Diagnostic Deployment Portfolio	2,000
	Equipment Capabilities Replacement Portfolio	7,120
	STS Environmental Capabilities Portfolio	4,902
Subtotal, Lawrence Livermore National Laboratory		**28,292**
LANL	PF-4 Trolley Buss Bar Replacement	7,600
	DARHT Axis 2 Component Replacement	3,240
	Sigma Foundry Vacuum Manifold	4,000
	Area I Flash Radiography Capability	2,460
Subtotal, Los Alamos National Laboratory		**17,300**
NNSS	DAF Mission Capabilities	4,500
	U1a Test Bed Diagnostics Upgrade	1,000
	Dynamic Platforms Upgrade for STL and NLV (FY 2023 Over target)	2,500
	NLV Capability Modernization	1,500
	JASPER Critical Gun Room Upgrades	2,500
	Thin Film Deposition Upgrade	2,000
Subtotal, Nevada National Security Site		**14,000**
PX	Production Tooling: Heat Treat Oven	1,500
	Mass Properties Measurement Machine - Bay 12	1,500
	Production Tooling: LaBlond Mill	1,100
	Mass Spectrometer - Gas Lab	2,000
	Production Tooling: Mazak Nexus Mill Replacement	2,500
	CoLOSSIS Camera Upgrade - Bay17	1,100
	Gas Lab Refresh - Bay 14	1,000
Subtotal, Pantex Plant		**10,700**

Site	Project Name	FY 2024 Allocation ($K)
SNL	PSL Equipment Upgrades	1,120
	TTR Field Radar Recapitalization	16,000
	6610 Shaker Replacement (METF)	3,450
	METF Equip Replacements & Upgrades	3,117
	LAMP HB Equipment Upgrades	3,400
Subtotal, Sandia National Laboratories		**27,087**
SRS	Mass Spec Replacement	3,000
	Replace Inert Metallography Lab Scanning Electron Microscope	4,500
Subtotal, Savannah River Site		**7,500**
Y-12	Dimensional Standards Lab HVAC (AHU-108)	1,000
	Gear Lab HVAC (AHU-109)	2,700
	Life Cert Oven Manifolds	6,500
	Leak Tank 1	4,800
	Electropolish Sampling System	1,800
Subtotal, Y-12 National Security Complex		**16,800**
HQ	Program Mgt, Planning, and Strategic Reserves	22,089
	Corporate Reserves	4,694
Grand Total, Capability Based Investments		**156,462**

Production Modernization
Capital Equipment Summary

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	350,898	376,514	402,493	+25,979
Expanded Flash X-Ray System, LLNL	8,000	5,556	1,844	600	0	-600
Next Generation Machining and Assembly for High Volume Pit Production, LLNL	8,915	0	8,915	0	0	0
DAF Pit Certification support gloveboxes, LLNL	21,400	0	0	0	21,400	+21,400
DAF pit residue processing gloveboxes, LLNL	21,600	0	0	0	0	0
DAF End of Life equipment replacement, LLNL	15,800	0	0	0	0	0
DAF SCE part fabrication equipment, LLNL	16,000	0	0	0	0	0
DAF SCE assembly equipment, LLNL	21,900	0	0	0	0	0
Downdraft, LLNL	5,374	0	1,099	0	4,275	+4,275
Automated Synthesis Instrument for HEMI, LLNL	5,000	0	0	0	0	0
10kg Firing Tank for HESF, LLNL	10,000	0	0	0	0	0
B332 Lathe Replacement, LLNL	5,000	0	0	5,000	0	-5,000
High Volume Production Special Equipment Installation, LLNL	8,932	0	0	0	0	0
Foundry Furnace Replacement, LLNL	5,420	0	0	0	0	0
Laser Welder, LLNL	6,532	0	0	0	6,532	+6,532
Metallography Polishing Line, LLNL	5,000	0	0	0	0	0
Metallography Grinding Line, LLNL	5,125	0	0	0	0	0
Forming & Fabrication Equipment Upgrades at Sigma (New Press), LANL	8,300	0	8,300	0	0	0
TRU Waste Glovebox Field Installation, LANL	8,000	0	8,000	0	0	0
TRU Waste Glovebox Project, LANL	17,843	9,318	6,080	2,445	0	-2,445
Foundry Upgrades Parts Staging (Previously Foundry Upgrades Phase 3), LANL	24,142	2,237	6,048	15,857	0	-15,857
Hot Inspection (Dimensional Inspection Box) (Previously Hot Inspection Phase 2), LANL	10,969	6,443	4,526	0	0	0
Final Machining #2 (Previously T-Base #1 Replacement), LANL	32,938	4,703	24,732	3,503	0	-3,503
Subassembly Installation, LANL	11,441	887	1,200	0	0	0
Immersion Density, LANL	17,349	6,899	8,145	2,305	0	-2,305
Heat Treat (90%), LANL	15,480	307	2,500	0	0	0
CNC Lathe (90%), LANL	13,361	4,539	2,408	6,414	0	-6,414
Machining Parts Staging #1 (Previously Machining (Parts Staging)), LANL	18,163	2,142	8,018	8,003	0	-8,003

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Machining Parts Staging #2, LANL	20,694	1,735	1,000	0	17,959	+17,959
Foundry Immersion Density, LANL	8,907	2,870	6,037	0	0	0
Coordinate Measurement Machine (CMM) #2, LANL	46,713	33,448	9,504	3,761	0	-3,761
Turnings Consolidation glovebox (Previously Install new turnings consolidation glovebox), LANL	35,519	519	0	0	35,000	+35,000
Microscopy Upgrades Project (MUP) (Previously Microprobe - TA-55), LANL	22,467	6,022	8,481	7,964	0	-7,964
Basement Radiography Upgrades, LANL	20,376	10,567	3,032	6,777	0	-6,777
Aqueous Nitrate Evaporator Upgrades (Prevously AQ-Nitrate Upgrades), LANL	12,667	331	0	0	12,336	+12,336
Aqueous Nitrate Cement Fixation Upgrades, LANL	13,183	494	0	0	12,689	+12,689
Room 126 MR&R Upgrade, LANL	22,873	18,151	4,722	0	0	0
MRR Open Front Hood Install, LANL	9,000	0	0	9,000	0	-9,000
AQ-Nitrate Recovery Upgrades (Previously Oxide Roast Glovebox), LANL	9,378	492	8,886	0	0	0
Size Reduction Press GB Installation, LANL	19,197	302	2,000	0	0	0
Electrorefining Line MC&A GB, LANL	12,869	0	2,000	0	0	0
D&D Bostomatic, LANL	9,226	6,921	2,305	0	0	0
Manufacturing Modernization Project (MMP), LANL	32,768	21,462	4,633	6,673	0	-6,673
CaCl2 "Salt Preparation", LANL	6,031	0	6,031	0	0	0
T-Base #2 (D&D and Replacement), LANL	30,500	0	0	30,500	0	-30,500
Install ICP-MS Multi-Collector into RLUOB (Neptune), LANL	6,187	1,787	4,400	0	0	0
Install Introductory Box XB #1, LANL	16,852	382	3,033	0	0	0
Load Frame Installation, LANL	19,681	1,382	3,202	15,097	0	-15,097
MC Upgrades at TFF - GLADOS Lab, LANL	7,596	0	7,596	0	0	0
Drill and Press D&D and Replacement, LANL	24,290	290	0	0	24,000	+24,000
Tunneling Electron Microscope, LANL	8,500	0	8,500	0	0	0
NCERC PLANET Upgrade, LANL	5,000	0	0	0	0	0
Lujan Scattering Center Capability - Compact Light Source, LANL	7,000	0	0	0	0	0
Lujan Scattering Center Capability - Multiple Simultaneous Neutron Measurements, LANL	10,000	0	0	0	0	0
Sigma Hydroform Press, LANL	8,200	0	0	0	0	0
Mobile Hot Cell, NNSS	5,000	0	0	0	0	0
DUECE HPC Capability, ORNL	20,000	0	0	20,000	0	-20,000
DUF6 to DUF4 Conversion Project (Formerly DUF4 Conversion Line) PPPO	123,780	31,780	6,000	30,000	23,000	-7,000
Replace Three 5-Axis Mills, 12-121, PX	9,812	3,312	5,000	1,500	0	-1,500

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
High-G Surveillance Testing Centrifuge (WETL, Pantex), SNL	8,200	4,800	3,400	0	0	0
High Current Ion Implanter, SNL	6,395	0	6,395	0	0	0
Flexible Production Stepper (previously I-line Multiple Wafer Size Stepper (ASML1 Replacement)), SNL	12,590	0	0	0	0	0
Rapid Thermal Annealing (RTA) Tool, SNL	5,000	0	5,000	0	0	0
Oxide CMP AMAT Mirra MESA, SNL	5,470	0	0	0	0	0
Backside Clean (previously SCREEN SU-2000 Backside Clean, SNL	5,570	0	0	0	5,570	+5,570
3" Capable Production Stepper Tool (previously XLS Stepper Tool - ASML PAS-5500 (GCA4 Replacement)), SNL	8,240	0	0	0	8,240	+8,240
FSI-Tel Track (ASML1), SNL	10,700	0	0	10,700	0	-10,700
Tonopah Test Range Radar #1, SNL	16,000	0	0	0	16,000	+16,000
Tonopah Test Range Radar #2, SNL	16,000	0	0	0	0	0
WB20/WB22 Replacement, SNL	5,110	0	0	0	5,110	+5,110
CMP Planarization Tool - AMAT Mirra, SNL	5,150	0	0	0	0	0
Diffusion Furnace Replacements (Qty 5), SNL	16,560	0	0	0	0	0
AMAT ALD (CVD) Tool, SNL	5,180	0	0	0	0	0
Teradyne Catalyst - Mixed-Signal Integrated Circuit Test System, SNL	5,140	0	0	0	0	0
FSI-TEL Track (ASML5), SNL	11,610	0	0	0	0	0
QU3991 Centrifuge Recap, SNL	7,540	0	0	0	7,540	+7,540
QU3992 Centrifuge Recap, SNL	10,115	0	0	0	0	0
Spare Tritium Extraction Furnace, formerly Tritium Extraction Facility (TEF) Spare Furnace, SRS	24,000	0	0	0	24,000	+24,000
Vapor Degreasing/Ultrasonic Cleaning Station, Y-12	6,000	400	5,600	0	0	0
CNC Jig Grinder, Y-12	5,500	0	0	0	0	0
9204-2E Enhanced Backfill Station, Y-12	6,000	0	0	6,000	0	-6,000
Calciner, Y-12	149,500	105,115	27,795	8,000	8,590	+590
Direct Chip Melt Bottom Loading Furnace (formerly Bottom Loading Furnace), Y12	219,182	31,300	19,863	31,725	33,600	+1,875
Electrorefining, Y-12	108,000	106,862	1,138	0	0	0
SM Production Press MIE, Y-12	7,000	0	0	7,000	0	-7,000

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
SM Design and Balance of Plant MIE, Y-12	23,000	0	0	2,000	21,000	+19,000
DUM Direct Cast Production Furnace Execution (formerly Direct Casting Production Furnace), Y-12	32,000	0	0	12,000	20,000	+8,000
Bldg. 9215 UCl3 STAR, Y-12	7,500	1,500	3,000	3,000	0	-3,000
DUM A2 Wing New Weldbox Installation, Y-12	16,597	0	1,597	15,000	0	-15,000
DUM Rolling Building 9215 High Temperature Salt Bath 350B Installation, Y-12	12,800	0	0	12,800	0	-12,800
DUM Rolling Annealing Furnace Installation, Y-12	20,960	0	960	10,000	10,000	0
9204-02 Additional Bird Bath Crystallizer, Y-12	7,500	0	7,500	0	0	0
DUM 9201-01 Vertical Turning Lathe Execution, Y-12	7,000	0	3,000	4,000	0	-4,000
DUM Machining 2 A5NW 5-Axis Machines Execution (formerly DUM Machining 3 A5NW 5-Axis Machines Execution), Y-12	5,000	0	0	5,000	0	-5,000
DUM 3500T Press Control Upgrade, Y-12	12,000	0	0	0	0	0
Machine Dust Transfer Station, Y-12	6,000	0	0	0	0	0
Vacuum Heat Treat Furnace, Y-12	6,000	0	0	0	0	0
UM Bldg 9204-2E Legacy Contaminated Chip, Y-12	6,000	0	0	0	6,000	+6,000
9204-2E Life Certification Oven Manifold, Y-12	5,000	0	0	0	5,000	+5,000
9201-01 Additional 5-Axis Mill, Y-12	5,000	0	0	0	5,000	+5,000
9204-2E Leak Tank #1, Y-12	5,000	0	0	0	5,000	+5,000
9204-2E Leak Tank #2, Y-12	5,000	0	0	0	0	0
9204-2E Leak Tank #3, Y-12	5,000	0	0	0	0	0
Machine Capability Lathe #2, Y-12	9,000	0	0	0	9,000	+9,000
Machine Capability Lathe #3, Y-12	9,000	0	0	0	0	0
Machine Capability Lathe #4, Y-12	9,000	0	0	0	0	0
DUM Foundry 2nd Vacuum Arc Remelt (VAR) Furnace, Y-12	30,000	0	0	0	0	0
DUM Mach 9215 Pencil Ingot Lathe FY24, Y-12	5,000	0	0	0	5,000	+5,000
DUM Mach 9215 Pencil Ingot Lathe FY25, Y-12	5,000	0	0	0	0	0
DUM Mach 9215 Pencil Ingot Lathe FY26, Y-12	5,000	0	0	0	0	0
DUM Foundry Cooling Can Load Station, Y-12	5,000	0	0	0	0	0
DUM Coordinate Measuring Machine 161210, Y-12	5,000	0	0	0	5,000	+5,000
Depleted and Binary Auxiliary Lab MIE, Y-12	5,000	0	0	0	0	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**624,323**	**679,138**	**759,334**	**+80,196**

Outyears for Capital Equipment Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	421,169	430,013	439,043	448,263	N/A
DAF pit residue processing gloveboxes, LLNL	21,600	0	0	0	0
DAF End of Life equipment replacement, LLNL	0	15,800	0	0	0
DAF SCE part fabrication equipment, LLNL	0	0	16,000	0	0
DAF SCE assembly equipment, LLNL	0	0	0	21,900	0
Automated Synthesis Instrument for HEMI, LLNL	5,000	0	0	0	0
10kg Firing Tank for HESF	0	10,000	0	0	0
High Volume Production Special Equipment Installation, LLNL	8,932	0	0	0	0
Foundry Furnace Replacement, LLNL	0	0	0	5,420	0
Metallography Polishing Line, LLNL	0	0	5,000	0	0
Metallography Grinding Line, LLNL	0	0	0	5,125	0
Subassembly Installation, LANL	9,354	0	0	0	0
Heat Treat (90%), LANL	0	12,673	0	0	0
Size Reduction Press GB Installation, LANL	16,895	0	0	0	0
Electrorefining Line MC&A GB, LANL	10,869	0	0	0	0
Install Introductory Box XB #1, LANL	13,437	0	0	0	0
NCERC PLANET Upgrade, LANL	1,600	3,400	0	0	0
Lujan Scattering Center Capability - Compact Light Source, LANL	0	1,600	5,400	0	0
Lujan Scattering Center Capability - Multiple Simultaneous Neutron Measurements, LANL	0	0	2,000	8,000	0
Sigma Hydroform Press, LANL	0	0	1,900	6,300	0
Mobile Hot Cell, NSSS	5,000	0	0	0	0
DUF6 to DUF4 Conversion Project (Formerly DUF4 Conversion Line) PPPO	23,000	10,000	0	0	0
Flexible Production Stepper (previously I-line Multiple Wafer Size Stepper (ASML1 Replacement)), SNL	0	12,590	0	0	0

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
	($K)				
Capital Equipment > $500K (including MIE)					
Oxide CMP AMAT Mirra MESA, SNL	5,470	0	0	0	0
Tonopah Test Range Radar #2, SNL	16,000	0	0	0	0
CMP Planarization Tool - AMAT Mirra, SNL	0	0	5,150	0	0
Diffusion Furnance Replacements (Qty 5), SNL	0	0	0	16,560	0
AMAT ALD (CVD) Tool	0	0	0	5,180	0
Teradyne Catalyst - Mixed-Signal Integrated Circuit Test System, SNL	0	0	0	5,140	0
FSI-TEL Track (ASML5), SNL	0	0	11,610	0	0
QU3992 Centrifuge Recap, SNL	0	0	10,115	0	0
CNC Jig Grinder, Y-12	5,500	0	0	0	0
Direct Chip Melt Bottom Loading Furnace (formerly Bottom Loading Furnace), Y12	35,560	33,400	25,000	8,734	0
DUM 3500T Press Control Upgrade, Y-12	12,000	0	0	0	0
Machine Dust Transfer Station, Y-12	0	0	6,000	0	0
Vacuum Heat Treat Furnace, Y-12	0	0	0	6,000	0
9204-2E Leak Tank #2, Y-12	5,000	0	0	0	0
9204-2E Leak Tank #3, Y-12	0	5,000	0	0	0
Machine Capability Lathe #3, Y-12	9,000	0	0	0	0
Machine Capability Lathe #4, Y-12	9,000	0	0	0	0
DUM Foundry 2nd Vacuum Arc Remelt (VAR) Furnace, Y-12	30,000	0	0	0	0
DUM Mach 9215 Pencil Ingot Lathe FY25, Y-12	5,000	0	0	0	0
DUM Mach 9215 Pencil Ingot Lathe FY26, Y-12	0	5,000	0	0	0
DUM Foundry Cooling Can Load Station, Y-12	5,000	0	0	0	0
Depleted and Binary Auxiliary Lab MIE, Y-12	5,000	0	0	0	0
Total, Capital Equipment (including MIE)	**679,386**	**539,476**	**527,218**	**536,622**	**N/A**

Production Modernization
Construction Project Summary

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
28-D-XXX, Radiography / Assembly Complex Replacement, LANL						
TEC	36,946	0	0	0	0	0
OPC	0	0	0	0	0	0
TPC, 28-D-XXX, Radiography / Assembly Complex Replacement, LANL	**36,946**	**0**	**0**	**0**	**0**	**0**
26-D-XXX, Agile Radiation Case and Component Capability (ARC), Y-12						
TEC	325,000	0	0	0	0	0
OPC	0	0	0	0	0	0
TPC, 26-D-XXX, Agile Radiation Case and Component Capability (ARC), Y-12	**325,000**	**0**	**0**	**0**	**0**	**0**
23-D-516, Energetic Materials Characterization Facility, LANL						
TEC	140,000	0	0	19,000	0	-19,000
OPC	17,242	6,860	0	0	0	0
TPC, 23-D-516, Energetic Materials Characterization Facility, LANL	**157,242**	**6,860**	**0**	**19,000**	**0**	**-19,000**
22-D-513, Power Sources Capability, SNL						
TEC	375,953	0	13,827	0	37,886	+37,886
OPC	24,767	8,395	6,352	0	1,000	+1,000
TPC, 22-D-513, Power Sources Capability, SNL	**400,720**	**8,395**	**20,179**	**0**	**38,886**	**+38,886**
21-D-512, Plutonium Pit Production Project, LANL						
TEC	4,080,781	226,000	338,084	447,234	617,000	+169,766
OPC	649,094	60,000	11,916	141,000	53,000	-88,000
Total Project Cost, 21-D-512, Plutonium Pit Production Project, LANL	**4,729,875**	**286,000**	**350,000**	**588,234**	**670,000**	**+81,766**

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
21-D-511, Savannah River Plutonium Processing Facility, SRS						
TEC	8,919,766	241,896	459,000	1,170,000	828,235	-341,765
OPC	2,180,234	421,213	16,000	30,000	30,000	0
Total Project Cost, 21-D-511, Savannah River Plutonium Processing Facility, SRS	**11,100,000**	**663,109**	**475,000**	**1,200,000**	**858,235**	**-341,765**
21-D-510 HE Synthesis, Formulation, and Production, PX						
TEC	402,803	30,600	44,500	108,000	0	-108,000
OPC	13,193	7,193	0	0	0	0
TPC, 21-D-510 HE Synthesis, Formulation, and Production, PX	**415,996**	**37,793**	**44,500**	**108,000**	**0**	**-108,000**
18-D-690, Lithium Processing Facility, Y-12						
TEC	1,545,000	150,405	164,902	213,886	200,770	-13,116
OPC[a]	100,000	21,424	3,000	3,000	10,000	+7,000
TPC, 18-D-690, Lithium Processing Facility, Y-12	**1,645,000**	**171,829**	**167,902**	**216,886**	**210,770**	**-6,116**
18-D-650, Tritium Finishing Facility, SRS						
TEC	660,239	54,000	27,000	73,300	0	-73,300
OPC[b]	77,700	11,700	2,000	0	8,000	+8,000
TPC, 18-D-650, Tritium Finishing Facility, SRS	**737,939**	**65,700**	**29,000**	**73,300**	**8,000**	**-65,300**
15-D-302, TA-55 Reinvestment Project Phase III, LANL						
TEC	187,915	64,438	27,000	30,002	30,000	-2
OPC	47,143	13,088	5,000	11,000	11,808	+808
TPC, 15-D-302, TA-55 Reinvestment Project Phase III, LANL	**235,058**	**77,526**	**32,000**	**41,002**	**41,808**	**+806**

[a] Lithium Processing Facility OPCs are funded under Lithium Modernization in FY 2020 and the prior years.
[b] Tritium Finishing Facility OPCs are funded under Tritium Sustainment and Modernization in FY 2020 and the outyears. 18-D-650 became Tritium Finishing Facility in FY 2020.

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
15-D-301, HE Science & Engineering Facility, PX						
TEC	256,628	135,272	0	20,000	101,356	+81,356
OPC	12,585	6,620	0	0	4,000	+4,000
TPC, 15-D-301, HE Science & Engineering Facility, PX	**269,213**	**141,892**	**0**	**20,000**	**105,356**	**+85,356**
07-D-220-04, Transuranic Liquid Waste Facility, LANL						
TEC[a]	184,295	129,536	30,000	24,759	0	-24,759
OPC	22,099	4,234	3,000	4,000	6,230	+2,230
TPC, 07-D-220-04, Transuranic Liquid Waste Facility, LANL	**206,394**	**133,770**	**33,000**	**28,759**	**6,230**	**-22,529**
06-D-141, Uranium Processing Facility, Y-12						
TEC[b]	8,195,208	5,283,248	586,500	548,847	710,000	+161,153
OPC	378,663	132,163	13,500	17,000	50,000	+33,000
TPC, 06-D-141, Uranium Processing Facility, Y-12	**8,573,871**	**5,415,411**	**600,000**	**565,847**	**760,000**	**+194,153**
04-D-125, Chemistry and Metallurgy Research Replacement, LANL						
TEC	2,124,802	1,725,474	110,970	138,123	125,235	-12,888
OPC	527,511	325,267	27,153	0	101,887	+101,887
TPC, 04-D-125, Chemistry and Metallurgy Research Replacement, LANL	**2,652,313**	**2,050,741**	**138,123**	**138,123**	**227,122**	**+88,999**
Total, Production Modernization						
TEC	**27,073,390**	**8,040,869**	**1,801,783**	**2,793,151**	**2,650,482**	**-142,669**
OPC	**4,050,231**	**1,018,157**	**87,921**	**206,000**	**275,925**	**69,925**
TPC Total, Production Modernization	**31,123,621**	**9,059,026**	**1,889,704**	**2,999,151**	**2,926,407**	**-72,744**

a Transuranic Liquid Waste Facility reflects rescission of $28,013 in FY 2017; In FY 2018, reflects an internal reprogramming from 12-D-301, Transuranic Waste Facilities, LANL project to this project for continued design activities conducted by the U.S. Army Corps of Engineers.

b Includes a reprogramming of approximately $203.1 million for FY 2023 that is being coordinated within the Administration.

Out Years for Construction Project Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
28-D-XXX, Radiography / Assembly Complex Replacement, LANL					
TEC	0	0	0	36,946	0
OPC	0	0	0	0	0
TPC, 28-D-XXX, Radiography / Assembly Complex Replacement, LANL	**0**	**0**	**0**	**36,946**	**0**
26-D-XXX, Agile Radiation Case and Component Capability (ARC), Y-12					
TEC	0	50,000	75,000	200,000	0
OPC	0	0	0	0	0
TPC, 26-D-XXX, Agile Radiation Case and Component Capability (ARC), Y-12	**0**	**50,000**	**75,000**	**200,000**	**0**
23-D-516, Energetic Materials Characterization Facility, LANL					
TEC	0	0	19,000	102,000	0
OPC	0	5,000	5,382	0	0
TPC, 23-D-516, Energetic Materials Characterization Facility, LANL	**0**	**5,000**	**24,382**	**102,000**	**0**
22-D-513, Power Sources Capability, SNL					
TEC	71,083	73,902	79,824	45,136	54,295
OPC	2,000	1,361	1,788	2,421	1,450
TPC, 22-D-513, Power Sources Capability, SNL	**73,083**	**75,263**	**81,612**	**47,557**	**55,745**
21-D-512, Plutonium Pit Production Project, LANL					
TEC	591,271	521,120	665,139	674,933	0
OPC	88,870	188,880	50,361	55,067	0
Total Project Cost, 21-D-512, Plutonium Pit Production Project, LANL	**680,141**	**710,000**	**715,500**	**730,000**	**0**

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
	($K)				
21-D-511, Savannah River Plutonium Processing Facility, SRS					
TEC	1,070,000	1,150,000	1,125,000	1,130,500	1,745,135
OPC	30,000	50,000	75,000	99,500	1,428,521
Total Project Cost, 21-D-511, Savannah River Plutonium Processing Facility, SRS	**1,100,000**	**1,200,000**	**1,200,000**	**1,230,000**	**3,173,656**
21-D-510 HE Synthesis, Formulation, and Production, PX					
TEC	0	0	38,838	180,865	0
OPC	1,000	0	0	5,000	0
TPC, 21-D-510 HE Synthesis, Formulation, and Production, PX	**1,000**	**0**	**38,838**	**185,865**	**0**
18-D-690, Lithium Processing Facility, Y-12					
TEC	264,000	270,000	263,000	18,037	0
OPC	16,000	20,000	22,000	4,576	0
TPC, 18-D-690, Lithium Processing Facility, Y-12	**280,000**	**290,000**	**285,000**	**22,613**	**0**
18-D-650, Tritium Finishing Facility, SRS					
TEC	0	0	120,000	200,000	185,939
OPC	10,500	11,000	10,000	13,000	11,500
TPC, 18-D-650, Tritium Finishing Facility, SRS	**10,500**	**11,000**	**130,000**	**213,000**	**197,439**
15-D-302, TA-55 Reinvestment Project Phase III, LANL					
TEC	34,475	2,000	0	0	0
OPC	5,700	547	0	0	0
TPC, 15-D-302, TA-55 Reinvestment Project Phase III, LANL	**40,175**	**2,547**	**0**	**0**	**0**

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
	($K)				
15-D-301, HE Science & Engineering Facility, PX					
TEC	0	0	0	0	0
OPC	1,965	0	0	0	0
TPC, 15-D-301, HE Science & Engineering Facility, PX	**1,965**	**0**	**0**	**0**	**0**
07-D-220-04, Transuranic Liquid Waste Facility, LANL					
TEC	0	0	0	0	0
OPC	4,635	0	0	0	0
TPC, 07-D-220-04, Transuranic Liquid Waste Facility, LANL	**4,635**	**0**	**0**	**0**	**0**
06-D-141, Uranium Processing Facility, Y-12					
TEC	485,000	350,000	174,000	57,613	0
OPC	65,000	50,000	51,000	0	0
TPC, 06-D-141, Uranium Processing Facility, Y-12	**550,000**	**400,000**	**225,000**	**57,613**	**0**
04-D-125, Chemistry and Metallurgy Research Replacement, LANL					
TEC	25,000	0	0	0	0
OPC	52,000	21,204	0	0	0
TPC, 04-D-125, Chemistry and Metallurgy Research Replacement, LANL	**77,000**	**21,204**	**0**	**0**	**0**
Total, Production Modernization					
TEC	**2,540,829**	**2,417,022**	**2,559,801**	**2,609,084**	**1,985,369**
OPC	**277,670**	**347,992**	**215,531**	**179,564**	**1,441,471**
TPC Total, Production Modernization	**2,818,499**	**2,765,014**	**2,775,332**	**2,788,648**	**3,426,840**

21-D-512, Los Alamos Plutonium Pit Production Project (LAP4)
Los Alamos National Laboratory (LANL)
Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary:

The Fiscal Year (FY) 2024 Request for the Los Alamos Plutonium Pit Production Project (LAP4) is $670,000,000 of Total Project Costs (TPC). The FY 2024 Request includes funds to continue design activities on the 30 Reliable Equipment Installation (30R) and Training and Development Center (TDC) subprojects; and to continue construction activities in the Decontamination and Demolition (D&D) subproject, 30 Base Equipment Installation (30B) subproject, and begin construction on the West Entry Control Facility (WECF) subproject.

LAP4 includes the procurement of equipment and systems to support a baseline production increase from 10 plutonium pits per year (ppy) at LANL to not less than 30 ppy, and to provide equipment and infrastructure necessary to support the reliable and timely provision of strategic weapons systems' primary components to strategic defense missions.

Critical Decision (CD)-1, *Approve Alternative Selection and Cost Range*, was approved April 27, 2021, with a TPC cost range of $2,700,000,000 - $3,900,000,000. The full project TPC will not be determined until all the subprojects are baselined at CD-2/3 approval, but it includes both Total Estimated Cost (TEC) and Other Project Cost (OPC) that will be executed through this line-item funding. The NNSA will continue value engineering efforts to reduce the total cost of the project and revise outyear amounts as design matures.

The project is supported by the Plutonium Pit Production Analysis of Alternatives (AoA), completed in October 2017, and the Plutonium Pit Production Engineering Assessment (EA), completed in April 2018.

Per DOE O 413.3B, any cost savings realized from a LAP4 subproject will be returned to the LAP4 Total Project contingency pool for use, as needed after approval of a baseline change, in other LAP4 subprojects within this CPDS.

Significant Changes:

This Construction Project Data Sheet (CPDS) is an update of the FY 2023 CPDS and does not include a new start for the budget year. The project will continue to refine the tailoring strategy to reflect program priorities, funding, resource availability, and other criteria, as is indicated in the changes in values between this submission and the one in FY 2023. These changes are reflected in Critical Milestone History and represent the current planning basis of the project. These changes are currently under review by NNSA. Until design is complete, and the performance baselines are established for each subproject, the finalization of the required funding profiles and completion dates cannot be established. Outyear funding amounts may be revised in future budget requests as NNSA baselines the project in accordance with DOE O 413.3B.

During the development of the performance baseline for the 30B subproject, it was discovered that the initial planning for the subproject was not sufficient. The design agent did not ramp up its staffing at the beginning of the design execution according to the plan, and once the detailed design was completed and the sequence for the installation of the equipment in the facility was determined, the estimates for the subproject cost and schedule had grown. Additionally, through numerous iterations of equipment analysis workshops, scope from the originally planned 30B subproject has been transferred to the 30R subproject. The transfer of this scope has delayed the completion of the 30R final design and has increased the subproject cost estimate. Additionally, the D&D subproject will need to be re-sequenced to match the 30B installation schedule, as well as include additional scope changes due to the installation of the non-LAP4 project 10 ppy equipment. As planning for the remaining subprojects continues, it will be reviewed to ensure sufficient planning has been done.

NNSA continues to assess the impacts on the TPC and the CD-4 date due to market conditions (e.g., tight labor market, supply chain delays, and inflation) and internal challenges (e.g., integration with aging infrastructure, site utility limitations, synchronization of multiple site projects, and interfacing work fronts). Construction projects across the nation are experiencing continuing impacts and the Nuclear Security Enterprise is especially susceptible to market conditions due to the skills and clearances required of our designers and craft personnel and the small, domestic, specialty suppliers often required. Based on these factors, the impacts being experienced on similar NNSA work, and changes post-CD-1 approval which moved scope into the 30R subproject, the potential impact on the project cost may be an increase of 30% to 40% and could extend the schedule by 2 to 4 years. The project will be able to further characterize impacts associated with current conditions and scope changes as the 30R subproject achieves the planned CD-2/3 approval in FY 2024.

Specific details on the LAP4 subprojects are listed below.

D&D Subproject (21-D-512-01): Has an established performance measurement baseline and is planning for a TPC of $529,000,000 and a schedule completion date of March 2027.

30 Base Equipment Installation (30B) Subproject (21-D-512-02): Achieved CD-3B, *Approve Long-Lead Procurements* on August 5, 2022, with a TPC of $43,000,000 and a completion date of June 2024. The 30B subproject reached 90% design completion, established a performance baseline (CD-2), and approved start of construction (CD-3) on January 19, 2023, with a TPC of $1,864,126,000 and CD-4 approval planned in August 2030. The final design is expected in 4Q FY 2023.

30 Reliable Equipment Installation (30R) Subproject (21-D-512-03): The 30R subproject, currently at CD-1, anticipates completing a CD-3A long-lead procurement package in June 2023. Final design completion is anticipated in December 2024 and, establishing a performance baseline (CD-2) and approving start of construction (CD-3) is anticipated in September 2024. The long-lead procurement activities are intended to help mitigate the delays associated with achieving CD-2/3 as originally planned at CD-1.

Training and Development Center (TDC) Subproject (21-D-512-04): Currently at CD-1, the TDC subproject anticipates final design completion, establishing a performance baseline (CD-2), and approving start of construction (CD-3) in June 2025.

West Entry Control Facility (WECF) Subproject (21-D-512-05): Currently at CD-1, the WECF subproject anticipates final design completion, establishing a performance baseline (CD-2), and approving start of construction (CD-3) in May 2024.

A Federal Project Director has been assigned to the project.

Critical Milestone History:

Los Alamos Plutonium Pit Production Project (21-D-512)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2021	11/25/2015	4Q FY 2020	1Q FY 2021	4Q FY 2022	4Q FY 2022	4Q FY 2022	2Q FY 2024	4Q FY 2028
FY 2022	11/25/2015	4Q FY 2020	04/27/2021	2Q FY 2023	1Q FY 2023	2Q FY 2023	N/A	4Q FY 2028
FY 2023	11/25/2015	03/08/2021	04/27/2021	4Q FY 2024	3Q FY 2024	4Q FY 2024	N/A	4Q FY 2028
FY 2024	11/25/2015	03/08/2021	04/27/2021	3Q FY 2025	3Q FY 2025	3Q FY 2025	N/A	4Q FY 2031

Decontamination and Demolition (D&D) Subproject (21-D-512-01)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2023	11/25/201	03/08/2021	04/27/2021	11/18/2021	2QFY 2022	11/18/2021	2Q FY 2027
FY 2024	11/25/201	03/08/2021	04/27/2021	11/18/2021	7/20/2022	11/18/2021	2Q FY 2027

30 Base Equipment Installation (30B) Subproject (21-D-512-02)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2023	11/25/2015	03/08/2021	04/27/2021	1Q FY 2023	4Q FY 2022	1Q FY 2023	4Q FY 2026
FY 2024	11/25/2015	03/08/2021	04/27/2021	01/19/2023	4Q FY 2023	01/19/2023	4Q FY 2030

Fiscal Year	CD-3A	CD-3B
FY 2022	2Q FY 2022	N/A
FY 2023	01/03/2022	N/A
FY 2024	01/03/2022	08/05/2022

CD-3A – Approve Long-Lead Procurements
CD-3B – Approve Long-Lead Procurements

30 Reliable Equipment Installation (30R) Subproject (21-D-512-03)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2023	11/25/2015	03/08/2021	04/27/2021	1Q FY 2024	4Q FY 2023	1Q FY 2024	4Q FY 2028
FY 2024	11/25/2015	03/08/2021	04/27/2021	4Q FY 2024	1Q FY 2025	4Q FY 2024	4Q FY 2031

Fiscal Year	CD-3A
FY 2023	1Q FY 2023
FY 2024	3Q FY 2023

CD-3A – Approve Long-Lead Procurements

Training and Development Center Subproject (TDC) (21-D-512-04)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2023	11/25/2015	03/08/2021	04/27/2021	4Q FY 2024	3Q FY 2024	4Q FY 2024	4Q FY 2028
FY 2024	11/25/2015	03/08/2021	04/27/2021	3Q FY 2025	3Q FY 2025	3Q FY 2025	4Q FY 2030

West Entry Control Facility (WECF) Subproject (21-D-512-05)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2023	11/25/2015	03/08/2021	04/27/2021	2Q FY 2023	4Q FY 2022	2Q FY 2023	2Q FY 2026
FY 2024	11/25/2015	03/08/2021	04/27/2021	3Q FY 2024	3Q FY 2024	3Q FY 2024	4Q FY 2028

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction
CD-4 – Approve Start of Operations or Project Closeout

Project Cost History

Los Alamos Plutonium Pit Production Project (21-D-512)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2021	116,900	79,100	196,000	30,000	30,000	226,000[a]
FY 2022	456,000	3,035,000	3,491,000	404,000	404,000	3,895,000
FY 2023	489,897	3,005,340	3,495,237	399,763	399,763	3,895,000[b]
FY 2024	555,285	3,525,496	4,080,781	649,094	649,094	4,729,875[c]

D&D Subproject (21-D-512-01)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2023	22,689	459,695	482,384	46,616	46,616	529,000
FY 2024	22,689	459,695	482,384	46,616	46,616	529,000

30B Subproject (21-D-512-02)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2023	212,626	1,599,990	1,812,616	213,384	213,384	2,026,000
FY 2024	204,894	1,268,160	1,473,054	391,072	391,072	1,864,126

[a] The project cost history amounts for FY 2021 reflected only funding requested in that budget year; TPC is not indicative of the total project cost.
[b] The TPC reflects the top of the CD-1 cost range.
[c] The TPC reflects the current 30R subproject estimate that is greater than the high end of the CD-1 cost range, due to the transfer of scope from the 30B subproject at CD-2/3 approval.

30R Subproject (21-D-512-03)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2023	163,074	517,871	680,945	79,055	79,055	760,000
FY 2024	236,194	1,369,857	1,606,051	150,698	150,698	1,756,749

TDC Subproject (21-D-512-04)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2023	71,185	331,947	403,132	46,868	46,868	450,000
FY 2024	71,185	331,947	403,132	46,868	46,868	450,000

WECF Subproject (21-D-512-05)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC	OPC, Total	TPC
FY 2023	20,323	95,837	116,160	13,840	13,840	130,000
FY 2024	20,323	95,837	116,160	13,840	13,840	130,000

2. Project Scope and Justification

Scope

The project scope includes the further repurposing of spaces within the existing LANL Plutonium Facility 4 (PF-4), beyond the scope of repurposing in the Chemistry and Metallurgy Research Replacement (CMRR) project, including removal of previously installed equipment and support systems as necessary to accommodate new pit production equipment. Scope includes design, construction, and installation of processing equipment, support systems, utilities infrastructure, physical infrastructure, and security features to reach the capability to produce 30 ppy. The PF-4 is an operating Hazard Category (HC)- 2, Security Category 1 Nuclear Facility. PF-4 and supporting capabilities need to be modified to achieve the required pit production capability/capacity.

The LAP4 project is composed of the five subprojects identified below.

Decontamination and Demolition (D&D) Subproject (21-D-512-01)
Decontamination and demolition of enclosures and programmatic equipment in PF-4 in preparation for installation of pit production equipment. The scope encompasses characterization, D&D, size reduction, removal, waste handling, and disposition.

30 Base Equipment Installation (30B) Subproject (21-D-512-02)
Pit production enclosures and programmatic equipment procurement and installation to support pit production capacity of a base of 30 ppy. The scope encompasses designing, procuring, installing, testing, transitioning to operations (TTO), and hot startup of new gloveboxes and associated equipment in PF-4. The 30B subproject establishes a capability and capacity to provide a minimum of 30 war reserve ppy to the stockpile. To support reduced project and program risk, long-lead procurement and fabrication of enclosures and process equipment was approved on January 3, 2022, with a cost of $72M, and is expected to be complete in June 2024. Additional long lead procurement and site preparation was approved on August 5, 2022, with a cost of $43M, and is expected to be complete in June 2024. Advanced procurement of the long-lead equipment integrates with the approval of CD-2/3 on January 19, 2023, enabling installation to proceed immediately after the approval of the performance baseline. Installation of the long-lead procurement will proceed as the remainder of the 30B enclosures and equipment are fabricated. This tailored approach minimizes impacts to program operations and

increases construction efficiencies. Additionally, temporary 80,000 sq ft warehouse space will be provided for the pre-staging of equipment for setup, testing, and assembly, prior to final installation.

30 Reliable Equipment Installation (30R) Subproject (21-D-512-03)
Pit production enclosures and programmatic equipment procurement and installation to support pit production capacity of 30 ppy reliably. The scope encompasses designing, procuring, installing, testing, transitioning to operations (TTO), and hot startup of new gloveboxes and associated equipment in PF-4 and the Sigma facility. The 30R subproject expands the capability and capacity to provide 30 war reserve pits per year to the stockpile at a 90% confidence using a single shift. To support reduced project and program risk, long-lead procurement and fabrication of enclosures and process equipment is planned for June 2023 and is expected to be complete in FY 2025. Advanced procurement of the long-lead equipment integrates with the anticipated approval of CD-2/3 in July of 2024, enabling installation to proceed immediately after the approval of the performance baseline. Installation of the long-lead procurement will proceed as the remainder of the 30R enclosures and equipment are fabricated. This tailored approach minimizes impacts to program operations and increases construction efficiencies.

Training and Development Center (TDC) Subproject (21-D-512-04)
The Training capability will ensure that production personnel can effectively receive approximately 700,000 required annual staff training hours for initial and annual training, including certification to fully satisfy skill and qualification requirements. The Development capability will support the enduring pit production mission by providing facilities and space for process improvement and development in a non-nuclear environment. The two capabilities require 75,000 net square feet and are briefly summarized below:

- Nuclear worker training laboratories for glovebox operator and fissile material handler fundamentals training and process worker requalification training. The requalification training laboratories will have a dual purpose to also support production process and technology development activities.
- Unclassified Training areas including classrooms, computer-based training rooms, a training records management center and training staff office space.
- Classified Training areas including classrooms, conference rooms, auditorium/lecture hall, classified records management and storage, facility control system simulation area, cold machine shop, a glovebox equipment pre-installation testing area, and a classified parts vault-type room.

West Entry Control Facility (WECF) Subproject (21-D-512-05)
The TA-55 WECF is required to accommodate the additional 800 workers per day entering the property protection area at TA-55 projected to implement the 30 ppy mission. This projected increase effectively doubles the workforce entrance control processing demand. The new WECF, like the existing East ECF, must be a DOE-compliant personnel screening facility which maintains integrity of the protected area at TA-55 to enable safe and secure environment for manufacturing operations and support the required 24/7 schedule.

<u>Justification</u>
The NNSA's ability to produce pits in the required quantities established by the Nuclear Weapons Council (NWC) is an essential component of the nuclear deterrent. An Analysis of Alternatives (AoA) was conducted after CD-0, in accordance with the requirements of Office of Management and Budget (OMB) Circular A-11. The AoA identified two preferred alternatives with different construction approaches at two separate locations:

- Additional capability and capacity to accomplish 30 ppy pit production requirements at Los Alamos National Laboratory (LANL); and,
- Refurbishment and repurposing of facilities at the Savannah River Site to accomplish the capability and capacity to reach an additional 50 ppy.

Sustained and reliable pit production at LANL additionally requires a commensurate increase in infrastructure and support facilities to accommodate the increased activity in a nuclear facility with a diversified mission portfolio. Resources necessary to operate and maintain a sustained and substantial production capacity drives a critical need for training infrastructure, which is included in this project. Increased ingress and egress of production personnel is also essential, and this project includes a new personnel access point/facility into Technical Area-55, which encloses the plutonium facilities. Other infrastructure upgrades necessary to support pit production goals have been identified, and will be acquired by other means, and are not included in the LAP4 project.

The NNSA Office of Cost Estimating and Program Evaluation conducted a review of the AoA and recommended that further refinement of the preferred alternatives be completed before selecting an alternative that meets requirements. NNSA contracted with an independent architecture and engineering (A&E) firm to complete an Engineering Assessment of the two preferred alternatives and two additional alternatives to provide the basis for a future decision.

The Chairwoman of the NWC provided written certification to Congress regarding the NNSA's recommended alternative on May 4, 2018. The NNSA Administrator selected a preferred alternative on May 10, 2018, to continue pit production investments to reach the 30 ppy capability at LANL by 2026, and to repurpose facilities at the Savannah River Site to produce 50 plutonium pits per year.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets.* Funds appropriated under the Plutonium Modernization Program and described in this data sheet may be used for contracted support services to the Federal Project Director and to conduct independent reviews of design and construction for LAP4.

Preliminary Key Performance Parameters (KPPs)

The KPPs represent the minimum acceptable performance that the project must achieve. Preliminary Key Performance Parameters were developed as part of the CD-1 approval and will be finalized for CD-2 approval.

Preliminary Key Performance Measures
D&D: Complete turnover, to facility operations, of the space and infrastructure of D&D items in PF-4 identified in the LAP4 Program Requirement Document (PRD), Appendix B.
D&D: Complete disposition and removal of decommissioned, demolished, and removed equipment waste from TA-55 under LAP4.
30B KPP1: Complete turnover to operations and equipment hot testing (as applicable) of the minimum equipment necessary for 30 war reserve PPY.
30B KPP2: Complete turnover to operations and equipment hot testing (as applicable) of the remaining equipment to support 30 war reserve PPY with moderate confidence.
30R: Complete equipment hot testing and turnover of all 30 ppy reliable equipment and structures, systems, and components in PF-4 and Sigma identified in the LAP4 PRD, Appendix B, to Weapons Production for initiation of Process Prove-in activities.
LAP4 Infrastructure: Training and Development Center, and TA-55 West Entry Control Facility will receive beneficial occupancy to allow operations.

3. Financial Schedule

The TPC in the financial schedule section does not reflect the top of the CD-1 cost range.

Total Project (21-D-512)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	153,946	153,946	21,015
FY 2022	138,021	138,021	88,037
FY 2023	162,957	162,957	275,089
FY 2024	62,442	62,442	120,323
FY 2025	37,919	37,919	50,821
Total Design	**555,285**	**555,285**	**555,285**
Construction			
FY 2021	72,054	72,054	5,167
FY 2022	200,063	200,063	64,398
FY 2023	284,277	284,277	333,258
FY 2024	554,558	554,558	497,341
FY 2025	553,352	553,352	502,568
FY 2026	521,120	521,120	597,100
FY 2027	665,139	665,139	583,813
FY 2028	674,933	674,933	535,037
FY 2029	0	0	275,400
FY 2030	0	0	106,557
FY 2031	0	0	24,857
Total Construction	**3,525,496**	**3,525,496**	**3,525,496**
TEC			
FY 2021	226,000	226,000	26,182
FY 2022	338,084	338,084	152,435
FY 2023	447,234	447,234	608,347
FY 2024	617,000	617,000	617,664
FY 2025	591,271	591,271	553,389
FY 2026	521,120	521,120	597,100
FY 2027	665,139	665,139	583,813
FY 2028	674,933	674,933	535,037
FY 2029	0	0	275,400
FY 2030	0	0	106,557
FY 2031	0	0	24,857
Total TEC	**4,080,781**	**4,080,781**	**4,080,781**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	1,932	1,932	1,930
FY 2020	58,068	58,068	24,950
FY 2021	0	0	28,241
FY 2022	11,916	11,916	7,548
FY 2023	141,000	141,000	26,200
FY 2024	53,000	53,000	77,700
FY 2025	88,870	88,870	86,592
FY 2026	188,880	188,880	100,659
FY 2027	50,361	50,361	118,754
FY 2028	55,067	55,067	94,023
FY 2029	0	0	40,000
FY 2030	0	0	30,704
FY 2031	0	0	11,793
Total, OPC	**649,094**	**649,094**	**649,094**
Total Project Costs (TPC)			
FY 2019	1,932	1,932	1,930
FY 2020	58,068	58,068	24,950
FY 2021	226,000	226,000	54,423
FY 2022	350,000	350,000	159,983
FY 2023	588,234	588,234	634,547
FY 2024	670,000	670,000	695,364
FY 2025	680,141	680,141	639,981
FY 2026	710,000	710,000	697,759
FY 2027	715,500	715,500	702,567
FY 2028	730,000	730,000	629,060
FY 2029	0	0	315,400
FY 2030	0	0	137,261
FY 2031	0	0	36,650
Total TPC	**4,729,875**	**4,729,875**	**4,729,875**

Decontamination and Decommissioning (D&D) Subproject (21-D-512-01)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	22,689	22,689	15,504
FY 2022	0	0	7,185
Total Design	**22,689**	**22,689**	**22,689**
Construction			
FY 2021	72,054	72,054	5,167
FY 2022	74,700	74,700	63,148
FY 2023	118,946	118,946	131,258
FY 2024	92,000	92,000	140,641
FY 2025	58,840	58,840	58,968
FY 2026	23,155	23,155	39,000
FY 2027	20,000	20,000	21,513
Total Construction	**459,695**	**459,695**	**459,695**
TEC			
FY 2021	94,743	94,743	20,671
FY 2022	74,700	74,700	70,333
FY 2023	118,946	118,946	131,258
FY 2024	92,000	92,000	140,641
FY 2025	58,840	58,840	58,968
FY 2026	23,155	23,155	39,000
FY 2027	20,000	20,000	21,513
Total TEC	**482,384**	**482,384**	**482,384**
Other Project Costs (OPC)			
FY 2019	302	302	300
FY 2020	9,289	9,289	3,875
FY 2021	0	0	4,387
FY 2022	1,000	1,000	-892
FY 2023	2,000	2,000	2,000
FY 2024	6,000	6,000	5,000
FY 2025	15,000	15,000	8,892
FY 2026	13,025	13,025	13,000
FY 2027	0	0	10,054
Total, OPC	**46,616**	**46,616**	**46,616**
Total Project Costs (TPC)			
FY 2019	302	302	300
FY 2020	9,289	9,289	3,875
FY 2021	94,743	94,743	25,058
FY 2022	75,700	75,700	69,441
FY 2023	120,946	120,946	133,258
FY 2024	98,000	98,000	145,641
FY 2025	73,840	73,840	67,860
FY 2026	36,180	36,180	52,000
FY 2027	20,000	20,000	31,567
Total TPC	**529,000**	**529,000**	**529,000**

30 Base Equipment Installation (30B) Subproject (21-D-512-02)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	130,257	130,257	5,511
FY 2022	74,637	74,637	71,294
FY 2023	0	0	128,089
Total Design	**204,894**	**204,894**	**204,894**
Construction			
FY 2022	125,363	125,363	1,250
FY 2023	124,369	124,369	162,000
FY 2024	337,000	337,000	276,700
FY 2025	288,800	288,800	268,600
FY 2026	172,628	172,628	258,100
FY 2027	140,000	140,000	137,300
FY 2028	80,000	80,000	54,200
FY 2029	0	0	90,400
FY 2030	0	0	19,610
Total Construction	**1,268,160**	**1,268,160**	**1,268,160**
TEC			
FY 2021	130,257	130,257	5,511
FY 2022	200,000	200,000	72,544
FY 2023	124,369	124,369	290,089
FY 2024	337,000	337,000	276,700
FY 2025	288,800	288,800	268,600
FY 2026	172,628	172,628	258,100
FY 2027	140,000	140,000	137,300
FY 2028	80,000	80,000	54,200
FY 2029	0	0	90,400
FY 2030	0	0	19,610
Total TEC	**1,473,054**	**1,473,054**	**1,473,054**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	966	966	966
FY 2020	29,034	29,034	12,492
FY 2021	0	0	14,138
FY 2022	4,000	4,000	78
FY 2023	139,000	139,000	24,200
FY 2024	47,000	47,000	72,700
FY 2025	40,000	40,000	72,700
FY 2026	131,072	131,072	72,700
FY 2027	0	0	72,700
FY 2028	0	0	48,398
Total, OPC	**391,072**	**391,072**	**391,072**
Total Project Costs (TPC)			
FY 2019	966	966	966
FY 2020	29,034	29,034	12,492
FY 2021	130,257	130,257	19,649
FY 2022	204,000	204,000	72,622
FY 2023	263,369	263,369	314,289
FY 2024	345,000	414,000	349,400
FY 2025	312,800	328,800	341,300
FY 2026	303,687	337,700	330,800
FY 2027	120,013	106,000	210,000
FY 2028	85,000	50,000	132,598
FY 2029	70,000	0	60,400
FY 2030	0	0	19,610
Total TPC	**1,864,126**	**1,864,126**	**1,864,126**

30 Reliable Equipment Installation (30R) Subproject (21-D-512-03)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2022	52,895	52,895	9,558
FY 2023	130,963	130,963	115,000
FY 2024	29,542	29,542	82,000
FY 2025	22,794	22,794	29,636
Total Design	**236,194**	**236,194**	**236,194**
Construction			
FY 2023	40,962	40,962	40,000
FY 2024	72,558	72,558	65,000
FY 2025	125,000	125,000	120,000
FY 2026	221,337	221,337	200,000
FY 2027	350,000	350,000	325,000
FY 2028	560,000	560,000	400,000
FY 2029	0	0	125,000
FY 2030	0	0	70,000
FY 2031	0	0	24,857
Total Construction	**1,369,857**	**1,369,857**	**1,369,857**
TEC			
FY 2022	52,895	52,895	9,558
FY 2023	171,925	171,925	155,000
FY 2024	102,100	102,100	147,000
FY 2025	147,794	147,794	149,636
FY 2026	221,337	221,337	200,000
FY 2027	350,000	350,000	325,000
FY 2028	560,000	560,000	400,000
FY 2029	0	0	125,000
FY 2030	0	0	70,000
FY 2031	0	0	24,857
Total TEC	**1,606,051**	**1,606,051**	**1,606,051**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	377	377	377
FY 2020	11,623	11,623	4,868
FY 2021	0	0	5,510
FY 2022	405	405	1,650
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	25,745	25,745	4,000
FY 2026	42,324	42,324	10,000
FY 2027	38,361	38,361	25,000
FY 2028	31,863	31,863	35,000
FY 2029	0	0	30,000
FY 2030	0	0	22,500
FY 2031	0	0	11,793
Total, OPC	**150,698**	**150,698**	**150,698**
Total Project Costs (TPC)			
FY 2019	377	377	377
FY 2020	11,623	11,623	4,868
FY 2021	0	0	5,510
FY 2022	53,300	53,300	11,208
FY 2023	171,925	171,925	155,000
FY 2024	102,100	102,100	147,000
FY 2025	173,539	173,539	153,636
FY 2026	263,661	263,661	210,000
FY 2027	388,361	388,361	350,000
FY 2028	591,863	591,863	435,000
FY 2029	0	0	155,000
FY 2030	0	0	92,500
FY 2031	0	0	36,650
Total TPC	**1,756,749**	**1,756,749**	**1,756,749**

Training and Development Center (TDC) Subproject (21-D-512-04)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2022	304	304	0
FY 2023	22,856	22,856	18,000
FY 2024	32,900	32,900	32,000
FY 2025	15,125	15,125	21,185
Total Design	**71,185**	**71,185**	**71,185**
Construction			
FY 2025	37,875	37,875	30,000
FY 2026	104,000	104,000	75,000
FY 2027	155,139	155,139	75,000
FY 2028	34,933	34,933	75,000
FY 2029	0	0	60,000
FY 2030	0	0	16,947
Total Construction	**331,947**	**331,947**	**331,947**
TEC			
FY 2022	304	304	0
FY 2023	22,856	22,856	18,000
FY 2024	32,900	32,900	32,000
FY 2025	53,000	53,000	51,185
FY 2026	104,000	104,000	75,000
FY 2027	155,139	155,139	75,000
FY 2028	34,933	34,933	75,000
FY 2029	0	0	60,000
FY 2030	0	0	16,947
Total TEC	**403,132**	**403,132**	**403,132**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	223	223	223
FY 2020	6,186	6,186	2,882
FY 2021	0	0	3,263
FY 2022	2,796	2,796	2,837
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	2,459	2,459	1,459
FY 2027	12,000	12,000	8,000
FY 2028	23,204	23,204	10,000
FY 2029	0	0	10,000
FY 2030	0	0	8,204
Total, OPC	**46,868**	**46,868**	**46,868**
Total Project Costs (TPC)			
FY 2019	223	223	223
FY 2020	6,186	6,186	2,882
FY 2021	0	0	3,263
FY 2022	3,100	3,100	2,837
FY 2023	22,856	22,856	18,000
FY 2024	32,900	32,900	32,000
FY 2025	53,000	53,000	51,185
FY 2026	106,459	106,459	76,459
FY 2027	167,139	167,139	83,000
FY 2028	58,137	58,137	85,000
FY 2029	0	0	70,000
FY 2030	0	0	25,151
Total TPC	**450,000**	**450,000**	**450,000**

West Entry Control Facility (WECF) Subproject (21-D-512-05)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	1,000	1,000	0
FY 2022	10,185	10,185	0
FY 2023	9,138	9,138	14,000
FY 2024	0	0	6,323
Total Design	**20,323**	**20,323**	**20,323**
Construction			
FY 2024	53,000	53,000	15,000
FY 2025	42,837	42,837	25,000
FY 2026	0	0	25,000
FY 2027	0	0	25,000
FY 2028	0	0	5,837
Total Construction	**95,837**	**95,837**	**95,837**
TEC			
FY 2021	1,000	1,000	0
FY 2022	10,185	10,185	0
FY 2023	9,138	9,138	14,000
FY 2024	53,000	53,000	21,323
FY 2025	42,837	42,837	25,000
FY 2026	0	0	25,000
FY 2027	0	0	25,000
FY 2028	0	0	5,837
Total TEC	**116,160**	**116,160**	**116,160**
Other Project Costs (OPC)			
FY 2019	64	64	64
FY 2020	1,936	1,936	833
FY 2021	0	0	943
FY 2022	3,715	3,715	3,875
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	8,125	8,125	1,000
FY 2026	0	0	3,500
FY 2027	0	0	3,000
FY 2028	0	0	625
Total, OPC	**13,840**	**13,840**	**13,840**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Project Costs (TPC)			
FY 2019	64	64	64
FY 2020	1,936	1,936	833
FY 2021	1,000	1,000	943
FY 2022	13,900	13,900	3,875
FY 2023	9,138	9,138	14,000
FY 2024	53,000	53,000	21,323
FY 2025	50,962	50,962	26,000
FY 2026	0	0	28,500
FY 2027	0	0	28,000
FY 2028	0	0	6,462
Total TPC	**130,000**	**130,000**	**130,000**

4. Details of Project Cost Estimate

Overall Project (21-D-512)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	478,354	371,468	N/A
Federal Design Support	14,298	20,585	N/A
Contingency	62,633	97,844	N/A
Total Design	**555,285**	**489,897**	**N/A**
Construction			
Site Work	80,953	85,400	N/A
Equipment	227,318	190,738	N/A
Construction	2,006,772	1,788,323	N/A
Federal Design Support	82,544	58,067	N/A
Contingency	1,127,909	882,812	N/A
Total Construction	**3,525,496**	**3,005,340**	**N/A**
Total Estimated Cost (TEC)	**4,080,781**	**3,495,237**	**N/A**
Contingency, TEC	***1,190,542***	***980,656***	**N/A**
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	55,175	58,379	N/A
Startup	445,904	257,900	N/A
Contingency	148,015	83,484	N/A
Total OPC	**649,094**	**399,763**	**N/A**
Contingency, OPC	*148,015*	*83,484*	*N/A*
Total Project Cost	**4,729,875**	**3,895,000**	**N/A**
Total Contingency (TEC+OPC)	***1,338,557***	***1,064,140***	***N/A***

Decontamination and Demolition (D&D) Subproject (21-D-512-01)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	22,689	22,689	22,689
Federal Design Support	0	0	0
Contingency	0	0	0
Total Design	**22,689**	**22,689**	**22,689**
Construction			
Site Preparation	0	0	0
Equipment	46,238	46,238	46,238
Construction	258,244	258,244	258,244
Federal Construction Support	11,946	11,946	11,946
Contingency	143,267	143,267	143,267
Total Construction	**459,695**	**459,695**	**459,695**
Total Estimated Cost (TEC)	**482,384**	**482,384**	**482,384**
Contingency, TEC	***143,267***	***143,267***	***143,267***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	8,616	8,616	8,616
Cold Startup	36,000	36,000	36,000
Contingency	2,000	2,000	2,000
Total OPC	**46,616**	**46,616**	**46,616**
Contingency, OPC	*2,000*	*2,000*	*2,000*
Total Project Cost	**529,000**	**529,000**	**529,000**
Total Contingency (TEC+OPC)	***145,267***	***145,267***	***145,267***

30 Base Equipment Installation (30B) Subproject (21-D-512-02)

($K)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	204,894	161,186	204,894
Federal Design Support	0	10,973	0
Contingency	0	40,467	0
Total Design	**204,894**	**212,626**	**204,894**
Construction			
Site Work	41,553	46,000	41,553
Equipment	38,166	60,000	38,166
Construction	729,248	983,373	729,248
Federal Design Support	40,000	28,853	40,000
Contingency	419,193	481,764	419,193
Total Construction	**1,268,160**	**1,599,990**	**1,268,160**
Total Estimated Cost (TEC)	**1,473,054**	**1,812,616**	**1,473,054**
Contingency, TEC	***419,193***	***522,231***	***419,193***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	27,596	30,800	27,596
Startup	267,533	131,200	363,476
Contingency	95,943	51,384	0
Total OPC	**391,072**	**213,384**	**391,072**
Contingency, OPC	*95,943*	*51,384*	*0*
Total Project Cost	**1,864,126**	**2,026,000**	**1,864,126**
Total Contingency (TEC+OPC)	***515,136***	***573,615***	***419,193***

30 Reliable Equipment Installation (30R) Subproject (21-D-512-03)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	183,848	120,670	N/A
Federal Design Support	9,490	4,804	N/A
Contingency	42,856	37,600	N/A
Total Design	**236,194**	**163,074**	**N/A**
Construction			
Site Work	0	-	N/A
Equipment	98,414	40,000	N/A
Construction	796,176	323,602	N/A
Federal Design Support	22,458	9,128	N/A
Contingency	452,809	145,141	N/A
Total Construction	**1,369,857**	**517,871**	**N/A**
Total Estimated Cost (TEC)	**1,606,051**	**680,945**	**N/A**
Contingency, TEC	***495,665***	***182,741***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	10,755	10,755	N/A
Startup	102,972	51,300	N/A
Contingency	36,971	17,000	N/A
Total OPC	**150,698**	**79,055**	**N/A**
Contingency, OPC	*36,971*	*17,000*	*N/A*
Total Project Cost	**1,756,749**	**760,000**	**N/A**
Total Contingency (TEC+OPC)	***532,636***	***199,741***	***N/A***

Training and Development Center (TDC) Subproject (21-D-512-04)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	51,923	51,923	N/A
Federal Design Support	3,885	3,885	N/A
Contingency	15,377	15,377	N/A
Total Design	**71,185**	**71,185**	**N/A**
Construction			
Site Work	30,600	30,600	N/A
Equipment	40,000	40,000	N/A
Construction	167,606	167,606	N/A
Federal Design Support	6,475	6,475	N/A
Contingency	87,266	87,266	N/A
Total Construction	**331,947**	**331,947**	**N/A**
Total Estimated Cost (TEC)	**403,132**	**403,132**	**N/A**
Contingency, TEC	***102,643***	***102,643***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	6,368	6,368	N/A
Startup	30,500	30,500	N/A
Contingency	10,000	10,000	N/A
Total OPC	**46,868**	**46,868**	**N/A**
Contingency, OPC	*10,000*	*10,000*	*N/A*
Total Project Cost	**450,000**	**450,000**	**N/A**
Total Contingency (TEC+OPC)	***112,643***	***112,643***	***N/A***

West Entry Control Facility (WECF) Subproject (21-D-512-05)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	51,923	51,923	N/A
Federal Design Support	3,885	3,885	N/A
Contingency	15,377	15,377	N/A
Total Design	**71,185**	**71,185**	**N/A**
Construction			
Site Work	30,600	30,600	N/A
Equipment	40,000	40,000	N/A
Construction	167,606	167,606	N/A
Federal Design Support	6,475	6,475	N/A
Contingency	87,266	87,266	N/A
Total Construction	**331,947**	**331,947**	**N/A**
Total Estimated Cost (TEC)	**403,132**	**403,132**	**N/A**
Contingency, TEC	***102,643***	***102,643***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Activities	6,368	6,368	N/A
Startup	30,500	30,500	N/A
Contingency	10,000	10,000	N/A
Total OPC	**46,868**	**46,868**	**N/A**
Contingency, OPC	*10,000*	*10,000*	*N/A*
Total Project Cost	**450,000**	**450,000**	**N/A**
Total Contingency (TEC+OPC)	***112,643***	***112,643***	***N/A***

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY2022	FY2023	FY 2024	FY 2025	FY2026	FY2027	FY2028	Out Years	Total
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A
	TPC	26,156	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	26,156
FY 2021	TEC	196,000	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	196,000
	OPC	30,000	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	30,000
	TPC	252,156	350,000	500,000	450,000	200,000	200,000	N/A	0	N/A	1,952,156
FY 2022	TEC	196,000	310,000	N/A	N/A	N/A	N/A	N/A	0	2,985,000	3,491,000
	OPC	60,000	40,000	N/A	N/A	N/A	N/A	N/A	0	274,000	374,000
	TPC	256,000	350,000	N/A	N/A	N/A	N/A	N/A	0	3,259,000	3,865,000
FY 2023	TEC	226,000	345,000	547,234	617,000	593,160	563,515	305,000	0	12,300	3,209,209
	OPC	60,000	5,000	41,000	53,000	66,840	61,485	60,000	0	42,000	389,325
	TPC	286,000	350,000	588,234	670,000	660,000	625,000	365,000	0	54,300	3,598,534
FY 2024	TEC	226,000	338,084	447,234	617,000	591,271	521,120	665,139	674,933	0	4,080,781
	OPC	60,000	11,916	141,000	53,000	88,870	188,880	50,361	55,067	0	649,094
	TPC	286,000	350,000	588,234	670,000	680,141	710,000	715,500	730,000	0	4,729,875

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	4Q FY 2031
Expected Useful Life (number of years)	50
Expected Future Start of D&D of this capital asset (fiscal quarter)	4Q FY 2081

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs[a]	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	$88	$88	$9,800	$9,800

7. D&D Information

The scope parameters established at CD-1 established the necessary site infrastructure improvements (West Entry Control Facility, Training and Development Center, temporary warehouse, material staging and laydown area, etc.) to support establishing a 30 ppy mission and to enable increased construction capacity, risk mitigation, and project efficiency.

These activities will include an increase in site square footage and the D&D of equipment within existing facilities. The D&D of existing facilities are not funded on this project. PF-4 D&D is not part of the LAP4 project scope. Some removal of contaminated equipment in PF-4 for space reuse will occur using project funds.

[a] Life cycle costs associated with this project were developed as part of CD-1. Neither the Plutonium Pit Production Analysis of Alternatives (AoA) nor Plutonium Pit Production Engineering Assessment (EA) evaluated life cycle costs of reaching 30 ppy at LANL separately from reaching the full 80 ppy production rate for various LANL options.

Gross Square Footage Created/Eliminated	WECF Square Feet	TDC Square Feet	Temporary Warehouse Square Feet
New area to be constructed by this project at Los Alamos National Laboratory………………………………………………………………….……	32,000	130,000	80,000
Area of D&D in this project at Los Alamos National Laboratory	0	0	0
Area at Los Alamos National Laboratory to be transferred, sold, and/or D&D outside the project including area previously "banked"………………………………………………………………………………………	32,000	130,000	80,000
Area of D&D in this project at other sites	0	0	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously "banked	0	0	0
Total area eliminated …………………….………………………………………………..	0	0	0

8. Acquisition Approach

Expansion of pit production capacity at LANL will be accomplished with the installation of systems of gloveboxes and equipment. Equipment installation to provide the capability to produce 10 ppy will be accomplished using program funding in the Plutonium Modernization Program. The installation of equipment to produce more than 10 ppy will be accomplished through this project. The LANL management and operating (M&O) contractor will execute design, and construction will be implemented with cleared and accomplished LANL craft resources. Subcontract installation of equipment is not feasible within PF-4, with consideration of concurrent operational activities and the requisite security and safety restraints. The performance baselines for each subproject will be established upon completion of 90% design maturity, to allow development of credible cost estimates in accordance with DOE O 413.3B and NNSA policy.

For infrastructure, non-nuclear design and construction will be executed via M&O-issued design-bid-build and design-build construction contracts. The performance baselines for each subproject will be established using a graded approach for design maturities appropriate for the various facility types, and to allow development of credible cost estimates in accordance with DOE O 413.3B and NNSA policy.

21-D-511, Savannah River Plutonium Processing Facility (SRPPF)
Savannah River Site (SRS), Aiken, South Carolina
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary:
The Fiscal Year (FY) 2024 Request for the Savannah River Plutonium Processing Facility (SRPPF) project is $858,235,000 of Total Project Costs (TPC). The most recent Department of Energy (DOE) approved Critical Decision (CD) for the project is CD-3A, *Approve Long Lead Procurement and Site Preparation,* approved on August 30, 2022 by the Deputy Administrator for Defense Programs. CD-0, *Approve Mission Need* for the "Plutonium Modular Approach," was approved on November 25, 2015. The approved mission need established the requirement for a responsive infrastructure to meet plutonium pit production requirements. This data sheet has been updated to reflect the outcome from approved programmatic changes in the project's scope that have occurred since CD-1 approval, which is further described in the Significant Changes section below. The final performance baseline will be established at 90% design completion to support CD-2/3 approval in FY 2025. A Federal Project Director (Level IV) has been assigned to this project and has approved this Construction Project Data Sheet (CPDS).

NNSA completed the Plutonium Pit Production analysis of alternatives (AoA) in October 2017 and the follow-on Plutonium Pit Production Engineering Assessment (EA) in April 2018. Both efforts informed NNSA's selection of a preferred alternative on May 10, 2018 to continue to invest in Los Alamos National Laboratory (LANL) for the capability to produce 30 ppy in 2026, and to repurpose existing facilities at Savannah River Site to produce a capability of 50 ppy in 2030. Based on information developed to support the CD-1 approval, NNSA has determined that achieving the required 50 war reserve ppy production rate at the Savannah River Site in 2030 is not feasible. Establishing the required SRPPF pit production capacity as close as possible to 2030 remains a high-priority and is required for sustaining the effectiveness of the Nation's nuclear deterrent.

The scope, cost and schedule estimates approved at CD-1 include an estimated cost range of $6,900,000,000 to $11,100,000,000 and a CD-4 schedule range of 1st Quarter FY 2032 to 4th Quarter FY 2035. The design has not progressed far enough to update the project cost estimate that was submitted in the FY 2023 CPDS.

Significant Changes:
This CPDS is an update of the FY 2023 CPDS and is not a new start.

The project team continued to finalize the preliminary design associated with the single line option (SLO) for process operations and in parallel developed a detailed, more risk-informed design performance baseline (DPB), aligned to Program Requirements Document (PRD) Revision 3. The PRD Revision 3, issued in January 2022, included NNSA requirements changes incorporating additional process utilities in unoccupied white space in the main process building and including additional process gloveboxes and utilities in the High Fidelity Training and Operations Center. The change to a High Fidelity Training and Operations Center (HFTOC) resulted in providing similar gloveboxes to those intended for the process building, which would help to improve the overall schedule for Weapons Design Agency War Reserve Authorization after approval of CD-4, Project Completion.

The DPB scope and cost were submitted to NNSA in May 2022, but in June 2022, an additional NNSA requirements change was identified in response to a Weapons Design Agency identified risk associated with process equipment single point failures and resulting throughput impacts. In October 2022, NNSA directed the M&O to award a Construction Management (CM) subcontract to an Engineering, Procurement and Construction firm to complete the SRPPF Project through CD-4 and the first phase of award is expected to be completed by June 2023. In December 2022, an updated tailoring strategy was presented to and approved by the Chief Executive for Project Management, authorizing a sixth subproject and delegation of PME authority as allowed and defined by DOE O 413.3B. These additional changes to the project have resulted in the need for an updated DPB which is scheduled for completion by the end of April 2023 and is anticipated to result in an increase in the design cost, and subsequently the construction cost. Until the updated DPB has been completed and approved by NNSA, the Critical Milestone and Project Cost sections of the data sheet, including the long lead procurement and site preparation approvals, are best estimates. Updates with further refinement will be reflected in the FY 2025 submission of the CPDS. The project is planning the work to efficiently execute within the funding requested in this data sheet.

A CD-3A, *Long Lead Procurement and Site Preparation*, (Dismantle and Removal (D&R)) package was approved on August 30, 2022, with the M&O subcontract award in October 2022 and start of work in January 2023. The initial 60% process design package was transmitted from the design subcontractor to the M&O Contractor Design Authority (DA). The second and final set of process designs was submitted in November 2022. The design subcontractor and M&O DA continue to work to resolve a portion of the 60% process design comments through April 2023. The first of three 90% process design packages were submitted by the design subcontractor in January 2023 to the M&O DA for review. The final two 90% design packages are scheduled to be submitted to the M&O DA in May 2023 and August 2023, respectively. The overall project 60% project design submittal is expected to be submitted from the design subcontractor in December 2023 to the M&O DA.

The FY 2023 appropriation and FY 2024 Request support preliminary and final design and provide support for the start of CD-3A D&R within the 226-F facility associated with the Main Process Building, CD-3X for Long-Lead procurements for gloveboxes/Process equipment, bulk materials and Balance of Plant (BOP) equipment, and early site preparation for the Utilities, Site, and Infrastructure, High Fidelity Training and Operations Center, and Sandfilter and Fanhouse Subprojects. The CD-2/3 for the Administrative Building Subproject, a design/build for a construction and maintenance building, is now anticipated in 1Q FY 2024. The overall project CD-2/3 approval is planned for FY 2025 and the Critical Milestone and Project Cost sections will be updated at that time.

Subproject descriptions are included in Section 2. The approved tailoring strategy includes the following subprojects:

- Utilities, Site Prep, and Infrastructure (USPI) Subproject (21-D-511-01)
- Main Process Buildings (MPB) Subproject (21-D-511-02)
- Administrative Building (ADMIN) Subproject (21-D-511-03)
- Safeguards and Security (S&S) Subproject (21-D-511-04)
- High Fidelity Training and Operations Center (HFTOC) Subproject (21-D-511-05)
- Sandfilter and Fanhouse (S&F) Subproject (21-D-511-06)

NOTE: Site preparations and long-lead procurements will be accomplished via CD-3X under applicable subprojects to optimize project schedule and help offset the delays in the completion of the designs for several subprojects. Prior to initiation of procurements or early site preparation, individual point estimate-based performance measurement baselines will be developed, reviewed, and approved by the appropriate NNSA approval authority, aligned with the estimated TPC of each CD-3X to establish the basis for performance and resource management.

In FY 2023 and FY 2024, the project will ensure design is completed and construction activities continue with: D&R of equipment and installed commodities in 226-F; long-lead gloveboxes/process and BOP equipment and materials and; early preparation and installation for all temporary facilities, utilities (above and below ground) and other general temporary infrastructure necessary to support mobilization and onboarding of construction resources, storage / laydown of construction materials and equipment, shop / fabrication / work areas, etc., to support initiation of SRPPF construction activities; and, final site work including installation of buried process support utilities and a waste transfer line, and demolition and removal of any unneeded MFFF support buildings (temporary and some permanent), and final roadways and grading. This includes the M&O award and timely transition of the CM EPC subcontractor and appropriate EPC scope in FY 2023 and FY 2024.

NNSA continues to assess the impacts on the TPC and CD-4 date due to market conditions (e.g., tight labor market, supply chain delays, and inflation) and internal challenges (e.g., integration with aging infrastructure, site utility limitations, synchronization of multiple site projects and interfacing work fronts). Construction projects across the nation are experiencing continuing impacts and the Nuclear Security Enterprise is especially susceptible to market conditions due to the skills and clearances required of our designers and craft personnel and the small, domestic, specialty suppliers often required. The Uranium Processing Facility (UPF) at the Y-12 National Security Complex represents the best analog for SRPPF. UPF had finished foundation and considerable structural work before COVID, is a nuclear project being constructed outside a PIDAS, includes a main processing building and various support structures, will include extensive commissioning, but not the introduction of nuclear material before completion, and is of similar scale. UPF experienced cost growth (during construction) of 40% due in large part to labor availability, labor productivity, and supply chain difficulties. These underlying labor and supply issues are replicated on virtually all NNSA projects, similar cost growth is being seen in nuclear projects between CD-1 and CD-2, and competitive subcontracts are returning proposals consistently higher than estimated.

With design approximately 60% complete, NNSA projects a design cost increase, beyond what is included in this data sheet, of at least $1 billion. Some of these additional design costs are due to the scope added since CD-1, including items to alleviate single points of failure and include unassigned (white) space for future capabilities. The integration of process and BOP design has proven more difficult than expected, adding costs. Difficulty attracting qualified designers (engineering staffing has been approximately 75% of the planned amount) created the need to offer incentives and is lengthening design time, increasing indirect costs. Considering the projected increase in design costs, the added scope, and the cost increases being experienced by similar projects, the potential impact on the project cost may be an increase of 20% to 40% and the schedule could extend by 1 to 3 years. To mitigate these impacts, NNSA has divided the project into six subprojects with 13 phases (CD-3Xs), to allow procurement to occur earlier (gloveboxes and bulk material) to avoid late delivery and to start work earlier than possible if waiting for the full project to be designed, to decrease work area conflicts on the site, and to decrease the number of peak craft needed. Also, rather than relying on the M&O Contractor, the project is in the process of hiring a construction management firm that will be responsible for project delivery, bringing specialized expertise to a construction and procurement project of this magnitude.

<u>**Critical Milestone History**</u>

Overall Project (21-D-511-01 through 21-D-511-06)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2021	11/25/2015	4Q FY 2020	2Q FY 2021	TBD	TBD	TBD	4Q FY 2026 - 4Q FY 2031[a]
FY 2022	11/25/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	1Q FY 2032 - 4Q FY 2035
FY 2023	11/25/2015	06/25/2021	06/25/2021	1Q FY 2024	4Q FY 2023	1Q FY 2024	1Q FY 2032 - 4Q 2035
FY 2024	11/25/2015	06/25/2021	06/25/2021	3Q FY 2025	2Q FY 2025	3Q FY 2025	1Q FY 2032 - 4Q FY 2035[b]

Utilities, Site Prep, and Infrastructure (USPI) Subproject (21-D-511-01)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2022	11/25/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	TBD
FY 2023	11/25/2015	06/25/2021	06/25/2021	2Q FY 2023	1Q FY 2023	2Q FY 2023	2Q FY 2030
FY 2024	11/25/2015	06/25/2021	06/25/2021	3Q FY 2025	2Q FY 2025	3Q FY 2025	2Q FY 2030

[a] CD-4 range was based on the *Plutonium Pit Production Engineering Assessment*

[b] CD-4 range reflects the range approved at CD-1.

Fiscal Quarter or Date

Fiscal Year	USPI CD-3A	USPI CD-3B
FY 2022	3Q FY 2021	N/A
FY 2023	4Q FY 2022	N/A
FY 2024	4Q FY 2023	TBD

Main Process Buildings (MPB) Subproject (21-D-511-02)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2022	11/25/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	TBD
FY 2023	11/25/2015	06/25/2021	6/25/2021	1Q FY 2024	4Q FY 2023	1Q FY 2024	1Q FY 2032 - 4Q FY 2035[b]
FY 2024	11/25/2015	06/25/2021	6/25/2021	3Q FY 2025	2Q FY 2025	3Q FY 2025	1Q FY 2032 - 4Q FY 2035[b]

Fiscal Quarter or Date

Fiscal Year	MPB CD-3A	MPB CD-3C	MPB CD-3E	MPB CD-3F	MPB CD-3G	MPB CD-3H	MPB CD-3I
FY 2022	3Q FY 2021	N/A	N/A	N/A	N/A	N/A	N/A
FY 2023	4Q FY 2022	N/A	N/A	N/A	N/A	N/A	N/A
FY 2024	08/30/2022	4Q FY 2023	4Q FY 2023	1Q FY 2025	1Q FY 2025	1Q FY 2025	TBD

Administrative Building (ADMIN) Subproject (21-D-511-03)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2022	11/25/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	TBD
FY 2023	11/25/2015	06/25/2021	6/25/2021	2Q FY 2023	1Q FY 2023	2Q FY 2023	4Q FY 2030
FY 2024	11/25/2015	06/25/2021	6/25/2021	1Q FY 2024	1Q FY 2024	1Q FY 2024	2Q FY 2026

Safeguards and Security (S&S) Subproject (21-D-511-04)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2022	11/25/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	TBD
FY 2023	11/25/2015	06/25/2021	6/25/2021	1Q FY 2024	3Q FY 2023	1Q FY 2024	3Q FY 2029
FY 2024	11/25/2015	06/25/2021	6/25/2021	3Q FY 2025	3Q FY 2025	3Q FY 2025	3Q FY 2029

High Fidelity Training and Operations Center (HFTOC) Subproject (21-D-511-05)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2022	11/15/2015	3Q FY 2021	3Q FY 2021	TBD	TBD	TBD	TBD
FY 2023	11/25/2015	06/25/2021	6/25/2021	2Q FY 2023	1Q FY 2023	2Q FY 2023	4Q FY 2028
FY 2024	11/25/2015	06/25/2021	6/25/2021	3Q FY 2025	3Q FY 2025	3Q FY 2025	4Q FY 2028

Fiscal Quarter or Date

Fiscal Year	HFTOC CD-3A	HFTOC CD-3B
FY 2024	1Q FY 2024	1Q FY 2025

Sandfilter and Fanhouse (S&F) Subproject (21-D-511-06)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2024	11/25/2015	06/25/2021	6/25/2021	3Q FY 2025	3Q FY 2025	3Q FY 2025	1Q FY 2032 – 4Q FY 2035[a]

Fiscal Quarter or Date

Fiscal Year	S&F CD-3A	S&F CD-3B
FY 2024	4Q FY 2023	1Q FY 2025

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3 – Approve Start of Construction
D&D Complete – Completion of Demolition and Disposal (D&D) work
CD-4 – Approve Start of Operations or Project Closeout

USPI Subproject (21-D-511-01) Long Lead Procurement and Site Preparation CD-3A – Site preparation and installation of all temporary facilities, utilities (above and below ground), other general temporary infrastructure necessary to support mobilization and onboarding of construction resources, i.e., storage / laydown of construction materials and equipment, shop / fabrication / work areas, etc., to support initiation of SRPPF construction activities. Final site work, including installation of buried process support utilities and a waste transfer line, demolition and removal of any unneeded MFFF support buildings (temporary and some permanent), and final roadways/grading.

USPI Subproject (21-D-511-01) Site Preparation CD-3B – If needed, additional site preparation activities, including underground utilities to support USPI.

MPB Subproject (21-D-511-02) Long Lead Procurement and Site Preparation (Dismantle and Removal (D&R)) CD-3A – Dismantle and removal of equipment, partially installed commodities, and coatings from Building 226-F. Site preparation activities including temporary ventilation, temporary electrical, temporary communications, and site services contract support activities.

MPB Subproject (21-D-511-02) Site Preparation CD-3C – Site preparation activities, including structural demolition and removal of wall sections to facilitate installation of gloveboxes and process equipment to support MPB.

MPB Subproject (21-D-511-02) Long Lead Procurement CD-3E – Initial long lead procurement of gloveboxes and process equipment to support MPB.

MPB Subproject (21-D-511-02) Long Lead Procurement CD-3F – Long lead procurement of bulk materials to support MPB.

MPB Subproject (21-D-511-02) Long Lead Procurement CD-3G – Long lead procurement of BOP equipment to support MPB.

[a] CD-4 range reflects the range approved at CD-1.

MPB Subproject (21-D-511-02) Long Lead Procurement CD-3H – Second package of long lead procurement of gloveboxes and process equipment to support MPB.

MPB Subproject (21-D-511-02) Long Lead Procurement CD-3I – If needed, third package of long lead procurement of gloveboxes and process equipment to support MPB.

HFTOC Subproject (21-D-511-05) Site Preparation CD-3A – Site preparation activities for the HFTOC including underground utilities work and building modifications to support receipt and installation of future equipment.

HFTOC Subproject (21-D-511-05) Long Lead Procurement CD-3B – Long lead procurement of gloveboxes and equipment to support the HFTOC.

S&F Subproject (21-D-511-06) Site Preparation CD-3A – Site preparation activities for the sandfilter and fanhouse facilities that includes stormwater drainage relocation, sheet piling for sand filter excavation, sand filter and fan house excavation, and installation of the sand filter mudmat.

S&F Subproject (21-D-511-06) Site Preparation CD-3B – If needed, additional site preparation activities, including the base mat installation for the sandfilter.

<u>**Project Cost History**</u>

Overall Project (21-D-511-01 through 21-D-511-05)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2021	241,896	0	N/A	241,896	110,000	110,000	4,590,000[a]
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	11,100,000
FY 2023	1,550,896	6,779,766	589,104	8,919,766	2,180,234	2,180,234	11,100,000
FY 2024	1,686,388	6,629,274	604,104	8,919,766	2,180,234	2,180,234	11,100,000[b]

USPI Subproject (21-D-511-01)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2023	93,500	406,500	60,000	560,000	60,000	60,000	620,000
FY 2024	93,500	388,500	50,000	532,000	54,000	54,000	586,000

MPB Subproject (21-D-511-02)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2023	1,318,896	5,704,766	441,104	7,464,766	1,935,234	1,935,234	9,400,000
FY 2024	1,454,388	5,297,274	441,104	7,192,766	1,866,234	1,866,234	9,059,000

[a] TEC and OPC amounts reflect estimated costs for FY 2021 only, the TPC amount reflects the high end of the cost range developed during the *Plutonium Pit Production Engineering Assessment* (EA) in 2018.

[b] TPC amount reflects the high-end cost range developed for the CD-1 package.

ADMIN Subproject (21-D-511-03)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2023	5,500	46,500	6,000	58,000	22,000	22,000	80,000
FY 2024	5,500	46,500	6,000	58,000	22,000	22,000	80,000

S&S Subproject (21-D-511-04)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2023	100,000	360,000	60,000	520,000	110,000	110,000	630,000
FY 2024	100,000	360,000	60,000	520,000	110,000	110,000	630,000

HFTOC Subproject (21-D-511-05)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2022	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2023	33,000	262,000	22,000	317,000	53,000	53,000	370,000
FY 2024	33,000	262,000	22,000	317,000	53,000	53,000	370,000

S&F Subproject (21-D-511-06)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Other	TEC, Total	OPC	OPC, Total	TPC
FY 2024	NA[a]	275,000	25,000	300,000	75,000	75,000	375,000

2. Project Scope and Justification

Scope

The 21-D-511 project scope includes repurposing Building 226-F, including removal of previously installed equipment and support systems as necessary to accommodate the new pit production mission. Scope includes turnover of all necessary design and quality documentation from the previous mission, any required modifications to Building 226-F and the design, construction and installation of processing equipment, process support systems and buildings, utilities and security features for a capability to produce 50 ppy. The 21-D-511 project will also include transfer, stewardship, and incorporation of select MFFF project government property into the SRPPF project, conversion of the Building 226-2F warehouse building into a high-fidelity training facility, and design and construction of support facilities. Given the special nuclear material (SNM) expected during operations in the SRPPF, Building 226-F will be a Hazard Category 2, Security Category I facility.

The SRPPF approved tailoring strategy includes the following subprojects.

USPI Subproject (21-D-511-01): This subproject will include: early preparation and installation for all temporary facilities, utilities (above and below ground) and other general temporary infrastructure necessary to support mobilization and onboarding of construction resources, storage / laydown of construction materials and equipment, shop / fabrication / work

[a] To create the S&F Subproject, scope is being transferred from the USPI and MPB subprojects. Due to maturity of overall project design development at the point in time that the S&F Subproject was authorized, it has been determined to complete design as planned and aligned to the original five subprojects. Attempting to break out remaining design scope specific to the S&F Subproject would not be clean and would unnecessarily delay design completion.

areas, etc., to support initiation of SRPPF construction activities; and, final site work including installation of buried process support utilities and a waste transfer line, and demolition and removal of any unneeded MFFF temporary support buildings, and final roadways and grading.

MPB Subproject (21-D-511-02): The Main Process Building includes design, procurement, 226-F construction, including CD-3A removal of equipment, partially installed commodities, and coatings from 226-F, testing and start-up of structures, systems and components necessary to produce a minimum of 50 ppy, and upgrade a facility to house first shift of Protection Force safeguards and security staff for training and construction interface purposes during overall project construction.

ADMIN Subproject (21-D-511-03): The Administration Building Subproject will include design and construction of an approximately 50,000 square foot new Maintenance and Construction support building. This primary mission need is to provide office space for operational management and support personnel. The Maintenance and Construction support building will be constructed early in the project schedule to allow for offices and management support during construction and start-up. The subproject will be integrated with the completion of the final phase of the Utilities, Site, and Infrastructure Subproject.

S&S Subproject (21-D-511-04): This subproject will include design and construction of entry control facilities, security fencing, reconfigure and remodel of Building 706-4F building for protective forces and other security infrastructure.

HFTOC Subproject (21-D-511-05): The High-Fidelity Training and Operations Center Subproject includes conversion of the building 226-2F warehouse building into a high-fidelity training facility, both classroom and hands-on equipment training. This high-fidelity training facility will contain nearly identical process gloveboxes and equipment lines for key processes, including balance of plant systems, to what will be installed in the main process building. This facility will provide the ideal location to perform cold development of future pit builds and train the future pit production workforce at SRS.

S&F Subproject (21-D-511-06): The Sandfilter and Fanhouse Subproject is a new subproject that includes site preparation activities and the installation of the sandfilter and fanhouse facilities, with supporting utilities.

Justification

NNSA's ability to produce pits in the required quantities established by the Nuclear Weapons Council (NWC) is an essential component of the nuclear deterrent. An Independent AoA was conducted after CD-0, in accordance with the requirements of Office of Management and Budget (OMB) Circular A-11. Multiple alternatives were analyzed and the AoA identified two preferred alternatives with different construction approaches at two separate locations:

- Refurbishment and repurposing of facilities at the Savannah River Site; and,
- Additional footprint to accommodate pit production requirements at LANL.

The NNSA Office of Cost Estimating and Program Evaluation conducted a review of the AoA in October 2017 and recommended that further refinement of the preferred alternatives be completed before selecting an alternative that meets requirements. NNSA contracted with an independent architecture and engineering (A&E) firm to complete the follow-on Engineering Assessment to evaluate two preferred alternatives and two additional alternatives to better inform the selection of an alternative and support conceptual design which was completed on April 20, 2018, along with a workforce analysis.

The NNSA Administrator selected a recommended alternative on May 10, 2018, to repurpose Building 226-F, a partially constructed facility at the SRS, for pit production to meet Department of Defense plutonium pit requirements by 2030. The selected alternative will continue to invest in LANL for the capability to produce 30 pits per year (ppy) in 2026, and to repurpose existing facilities at SRS to produce a capability of 80 ppy (both sites) during 2030. The Chairwoman of the Nuclear Weapons Council provided written certification to Congress regarding the NNSA's recommended alternative.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets.* Funds appropriated under this project may be used for contracted support services to the Federal Project Director and to conduct independent reviews and oversight of design and construction for SRPPF.

Key Performance Parameters (KPPs)

KPPs will be finalized in support of CD-2 documentation, the preliminary KPPs below will be revised in support of CD-2.

Performance Measure[a]
226-F Dismantle and Removal (D&R): Complete dismantlement and removal of MFFF equipment and utility commodities in 226-F.
50 ppy Process and Equipment: Complete successful Operational Readiness Review including completion of integrated Cold System Testing and turnover of all 50 ppy facility, systems and components identified in the SRPPF Program Requirements Document (PRD) to Weapons Production for initiation of hot operations Process Prove-in activities.
Physical Safeguards and Security (S&S) Infrastructure: Complete successful S&S integrated systems and components testing and reconfiguration of 706-4F including project turnover in support of the 50 PPY SRPPF Process and Equipment Operational Readiness Review.
High Fidelity Training and Operations Center (HFTOC): High Fidelity Training and Operations Center will receive beneficial occupancy approval to allow utilization by the Project for Technology maturation and operational preparations with ultimate turnover to Plutonium Operations
SRPPF Infrastructure: Receive beneficial occupancy to support early project utilization and ultimate operations in accordance with the PRD.

3. Project Cost and Schedule

Financial Schedule

SRPPF funding will be appropriated at the Overall Project level (21-D-511) and be allocated to the subprojects in the tables below. NOTE: Tables reflect funding in outyears beyond CD-4 completion anticipated to be needed for project financial closeout.

[a] These Preliminary Key Performance Parameters were developed as part of the CD-1 package.

Overall Project (21-D-511-01 through 21-D-511-05)

($K)			
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Total Estimated Cost (TEC)			
Design			
FY 2021	241,896	241,896	29,870
FY 2022	359,000	359,000	316,421
FY 2023	500,000	500,000	581,769
FY 2024	500,000	500,000	490,500
FY 2025	85,492	85,492	267,828
Total Design	**1,686,388**	**1,686,388**	**1,686,388**
Construction			
FY 2022	100,000	100,000	0
FY 2023	670,000	670,000	380,500
FY 2024	328,235	328,235	441,000
FY 2025	984,508	984,508	837,000
FY 2026	1,150,000	1,150,000	1,233,000
FY 2027	1,125,000	1,125,000	1,275,000
FY 2028	1,130,500	1,130,500	1,229,000
FY 2029	450,000	450,000	390,000
FY 2030	600,000	600,000	540,000
FY 2031	400,000	400,000	440,000
FY 2032	295,135	295,135	328,500
FY 2033	0	0	60,000
FY 2034	0	0	40,000
FY 2035	0	0	39,378
Total Construction	**7,233,378**	**7,233,378**	**7,233,378**
TEC			
FY 2021	241,896	241,896	29,870
FY 2022	459,000	459,000	316,421
FY 2023	1,170,000	1,170,000	962,269
FY 2024	828,235	828,235	931,500
FY 2025	1,070,000	1,070,000	1,104,828
FY 2026	1,150,000	1,150,000	1,233,000
FY 2027	1,125,000	1,125,000	1,275,000
FY 2028	1,130,500	1,130,500	1,229,000
FY 2029	450,000	450,000	390,000
FY 2030	600,000	600,000	540,000
FY 2031	400,000	400,000	440,000
FY 2032	295,135	295,135	328,500
FY 2033	0	0	60,000
FY 2034	0	0	40,000
FY 2035	0	0	39,378
Total TEC	**8,919,766**	**8,919,766**	**8,919,766**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	91,313	91,313	39,328
FY 2020	219,900	219,900	143,744
FY 2021	110,000	110,000	184,824
FY 2022	16,000	16,000	8,302
FY 2023	30,000	30,000	25,600
FY 2024	30,000	30,000	45,469
FY 2025	30,000	30,000	56,313
FY 2026	50,000	50,000	59,692
FY 2027	75,000	75,000	75,200
FY 2028	99,500	99,500	100,200
FY 2029	749,000	749,000	695,000
FY 2030	399,500	399,500	428,500
FY 2031	202,000	202,000	104,000
FY 2032	78,021	78,021	92,250
FY 2033	0	0	50,000
FY 2034	0	0	42,312
FY 2035	0	0	29,500
Total, OPC	**2,180,234**	**2,180,234**	**2,180,234**
Total Project Costs (TPC)			
FY 2019	91,313	91,313	39,328
FY 2020	219,900	219,900	143,744
FY 2021	351,896	351,896	214,694
FY 2022	475,000	475,000	324,723
FY 2023	1,200,000	1,200,000	987,869
FY 2024	858,235	858,235	976,969
FY 2025	1,100,000	1,100,000	1,161,141
FY 2026	1,200,000	1,200,000	1,292,692
FY 2027	1,200,000	1,200,000	1,350,200
FY 2028	1,230,000	1,230,000	1,329,200
FY 2029	1,199,000	1,199,000	1,085,000
FY 2030	999,500	999,500	968,500
FY 2031	602,000	602,000	544,000
FY 2032	373,156	373,156	420,750
FY 2033	0	0	110,000
FY 2034	0	0	82,312
FY 2035	0	0	68,878
Total TPC	**11,100,000**	**11,100,000**	**11,100,000**

USPI Subproject (21-D-511-01)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	5,000	5,000	741
FY 2022	87,500	87,500	37,259
FY 2023	1,000	1,000	40,500
FY 2024	0	0	10,000
FY 2025	0	0	5,000
Total Design	**93,500**	**93,500**	**93,500**
Construction			
FY 2022	20,000	20,000	0
FY 2023	58,000	58,000	0
FY 2024	66,000	66,000	75,000
FY 2025	75,000	75,000	61,000
FY 2026	17,000	17,000	56,500
FY 2027	141,500	141,500	146,000
FY 2028	7,000	7,000	7,000
FY 2029	5,000	5,000	6,000
FY 2030	49,000	49,000	38,500
FY 2031	0	0	20,000
FY 2032	0	0	28,500
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total Construction	**438,500**	**438,500**	**438,500**
TEC			
FY 2021	5,000	5,000	741
FY 2022	107,500	107,500	37,259
FY 2023	59,000	59,000	40,500
FY 2024	66,000	66,000	85,000
FY 2025	75,000	75,000	66,000
FY 2026	17,000	17,000	56,500
FY 2027	141,500	141,500	146,000
FY 2028	7,000	7,000	7,000
FY 2029	5,000	5,000	6,000
FY 2030	49,000	49,000	38,500
FY 2031	0	0	20,000
FY 2032	0	0	28,500
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TEC	**532,000**	**532,000**	**532,000**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	400	400	150
FY 2024	9,800	9,800	7,900
FY 2025	400	400	450
FY 2026	400	400	450
FY 2027	0	0	200
FY 2028	0	0	200
FY 2029	18,000	18,000	18,500
FY 2030	25,000	25,000	20,000
FY 2031	0	0	5,000
FY 2032	0	0	1,150
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total, OPC	**54,000**	**54,000**	**54,000**
Total Project Costs (TPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	5,000	5,000	741
FY 2022	107,500	107,500	37,259
FY 2023	59,400	59,400	40,650
FY 2024	75,800	75,800	92,900
FY 2025	75,400	75,400	66,450
FY 2026	17,400	17,400	56,950
FY 2027	141,500	141,500	146,200
FY 2028	7,000	7,000	7,200
FY 2029	23,000	23,000	24,500
FY 2030	74,000	74,000	58,500
FY 2031	0	0	25,000
FY 2032	0	0	29,650
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TPC	**586,000**	**586,000**	**586,000**

MPB (MPB) Subproject (21-D-511-02)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	234,396	234,396	28,832
FY 2022	224,000	224,000	251,959
FY 2023	439,500	439,500	471,769
FY 2024	471,000	471,000	450,000
FY 2025	85,492	85,492	251,828
Total Design	**1,454,388**	**1,454,388**	**1,454,388**
Construction			
FY 2022	80,000	80,000	0
FY 2023	592,000	592,000	380,500
FY 2024	198,235	198,235	313,000
FY 2025	764,508	764,508	654,000
FY 2026	959,500	959,500	979,000
FY 2027	728,500	728,500	879,000
FY 2028	904,500	904,500	998,000
FY 2029	295,000	295,000	239,000
FY 2030	541,000	541,000	486,500
FY 2031	390,000	390,000	410,000
FY 2032	285,135	285,135	290,000
FY 2033	0	0	50,000
FY 2034	0	0	30,000
FY 2035	0	0	29,378
Total Construction	**5,738,378**	**5,738,378**	**5,738,378**
TEC			
FY 2021	234,396	234,396	28,832
FY 2022	304,000	304,000	251,959
FY 2023	1,031,500	1,031,500	852,269
FY 2024	669,235	669,235	763,000
FY 2025	850,000	850,000	905,828
FY 2026	959,500	959,500	979,000
FY 2027	728,500	728,500	879,000
FY 2028	904,500	904,500	998,000
FY 2029	295,000	295,000	239,000
FY 2030	541,000	541,000	486,500
FY 2031	390,000	390,000	410,000
FY 2032	285,135	285,135	290,000
FY 2033	0	0	50,000
FY 2034	0	0	30,000
FY 2035	0	0	29,378
Total TEC	**7,192,766**	**7,192,766**	**7,192,766**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	91,313	91,313	39,328
FY 2020	219,900	219,900	143,744
FY 2021	110,000	110,000	184,824
FY 2022	16,000	16,000	8,302
FY 2023	27,100	27,100	24,750
FY 2024	8,200	8,200	26,569
FY 2025	3,100	3,100	34,863
FY 2026	26,600	26,600	36,442
FY 2027	46,500	46,500	45,000
FY 2028	37,000	37,000	40,000
FY 2029	676,000	676,000	623,500
FY 2030	354,500	354,500	403,500
FY 2031	182,000	182,000	84,000
FY 2032	68,021	68,021	71,100
FY 2033	0	0	40,000
FY 2034	0	0	32,312
FY 2035	0	0	28,000
Total, OPC	**1,866,234**	**1,866,234**	**1,866,234**
Total Project Costs (TPC)			
FY 2019	91,313	91,313	39,328
FY 2020	219,900	219,900	143,744
FY 2021	344,396	344,396	213,656
FY 2022	320,000	320,000	260,261
FY 2023	1,058,600	1,058,600	877,019
FY 2024	677,435	677,435	789,569
FY 2025	853,100	853,100	940,691
FY 2026	986,100	986,100	1,015,442
FY 2027	775,000	775,000	924,000
FY 2028	941,500	941,500	1,038,000
FY 2029	971,000	971,000	862,500
FY 2030	895,500	895,500	890,000
FY 2031	572,000	572,000	494,000
FY 2032	353,156	353,156	361,100
FY 2033	0	0	90,000
FY 2034	0	0	62,312
FY 2035	0	0	57,378
Total TPC	**9,059,000**	**9,059,000**	**9,059,000**

ADMIN Subproject (21-D-511-03)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	500	500	49
FY 2022	2,500	2,500	2,451
FY 2023	2,500	2,500	2,000
FY 2024	0	0	1,000
FY 2025	0	0	0
Total Design	**5,500**	**5,500**	**5,500**
Construction			
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	24,000	24,000	18,000
FY 2025	25,000	25,000	27,000
FY 2026	3,500	3,500	7,500
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total Construction	**52,500**	**52,500**	**52,500**
TEC			
FY 2021	500	500	49
FY 2022	2,500	2,500	2,451
FY 2023	2,500	2,500	2,000
FY 2024	24,000	24,000	19,000
FY 2025	25,000	25,000	27,000
FY 2026	3,500	3,500	7,500
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TEC	**58,000**	**58,000**	**58,000**

($K)	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	500	500	200
FY 2024	10,000	10,000	10,000
FY 2025	10,000	10,000	10,000
FY 2026	1,500	1,500	1,800
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total, OPC	**22,000**	**22,000**	**22,000**
Total Project Costs (TPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	500	500	49
FY 2022	2,500	2,500	2,451
FY 2023	3,000	3,000	2,200
FY 2024	34,000	34,000	29,000
FY 2025	35,000	35,000	37,000
FY 2026	5,000	5,000	9,300
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TPC	**80,000**	**80,000**	**80,000**

S&S Subproject (21-D-511-04)

($K)	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	1,000	1,000	124
FY 2022	20,000	20,000	14,376
FY 2023	50,000	50,000	51,000
FY 2024	29,000	29,000	24,500
FY 2025	0	0	10,000
Total Design	**100,000**	**100,000**	**100,000**
Construction			
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	20,000	20,000	10,000
FY 2026	55,000	55,000	60,000
FY 2027	125,000	125,000	125,000
FY 2028	120,000	120,000	120,000
FY 2029	100,000	100,000	105,000
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total Construction	**420,000**	**420,000**	**420,000**
TEC			
FY 2021	1,000	1,000	124
FY 2022	20,000	20,000	14,376
FY 2023	50,000	50,000	51,000
FY 2024	29,000	29,000	24,500
FY 2025	20,000	20,000	20,000
FY 2026	55,000	55,000	60,000
FY 2027	125,000	125,000	125,000
FY 2028	120,000	120,000	120,000
FY 2029	100,000	100,000	105,000
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TEC	**520,000**	**520,000**	**520,000**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	500	500	0
FY 2024	0	0	0
FY 2025	500	500	500
FY 2026	500	500	500
FY 2027	8,500	8,500	7,000
FY 2028	55,000	55,000	54,000
FY 2029	45,000	45,000	48,000
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total, OPC	**110,000**	**110,000**	**110,000**
Total Project Costs (TPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	1,000	1,000	124
FY 2022	20,000	20,000	14,376
FY 2023	50,500	50,500	51,000
FY 2024	29,000	29,000	24,500
FY 2025	20,500	20,500	20,500
FY 2026	55,500	55,500	60,500
FY 2027	133,500	133,500	132,000
FY 2028	175,000	175,000	174,000
FY 2029	145,000	145,000	153,000
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TPC	**630,000**	**630,000**	**630,000**

HFTOC Subproject (21-D-511-05)

($K)	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	1,000	1,000	124
FY 2022	25,000	25,000	10,376
FY 2023	7,000	7,000	16,500
FY 2024	0	0	5,000
FY 2025	0	0	1,000
Total Design	**33,000**	**33,000**	**33,000**
Construction			
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	50,000	50,000	45,000
FY 2026	85,000	85,000	80,000
FY 2027	80,000	80,000	85,000
FY 2028	69,000	69,000	74,000
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total Construction	**284,000**	**284,000**	**284,000**
TEC			
FY 2021	1,000	1,000	124
FY 2022	25,000	25,000	10,376
FY 2023	7,000	7,000	16,500
FY 2024	0	0	5,000
FY 2025	50,000	50,000	46,000
FY 2026	85,000	85,000	80,000
FY 2027	80,000	80,000	85,000
FY 2028	69,000	69,000	74,000
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TEC	**317,000**	**317,000**	**317,000**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	500	500	0
FY 2024	0	0	0
FY 2025	15,000	15,000	10,000
FY 2026	20,000	20,000	20,000
FY 2027	15,000	15,000	20,000
FY 2028	2,500	2,500	3,000
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total, OPC	**53,000**	**53,000**	**53,000**
Total Project Costs (TPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	1,000	1,000	124
FY 2022	25,000	25,000	10,376
FY 2023	7,500	7,500	16,500
FY 2024	0	0	5,000
FY 2025	65,000	65,000	56,000
FY 2026	105,000	105,000	100,000
FY 2027	95,000	95,000	105,000
FY 2028	71,500	71,500	77,000
FY 2029	0	0	0
FY 2030	0	0	0
FY 2031	0	0	0
FY 2032	0	0	0
FY 2033	0	0	0
FY 2034	0	0	0
FY 2035	0	0	0
Total TPC	**370,000**	**370,000**	**370,000**

S&F Subproject (21-D-511-06)

($K)	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2022	0	0	0
FY 2023	20,000	20,000	0
FY 2024	40,000	40,000	35,000
FY 2025	50,000	50,000	40,000
FY 2026	30,000	30,000	50,000
FY 2027	50,000	50,000	40,000
FY 2028	30,000	30,000	30,000
FY 2029	50,000	50,000	40,000
FY 2030	10,000	10,000	15,000
FY 2031	10,000	10,000	10,000
FY 2032	10,000	10,000	10,000
FY 2033	0	0	10,000
FY 2034	0	0	10,000
FY 2035	0	0	10,000
Total Construction	**300,000**	**300,000**	**300,000**
TEC			
FY 2023	20,000	20,000	0
FY 2024	40,000	40,000	35,000
FY 2025	50,000	50,000	40,000
FY 2026	30,000	30,000	50,000
FY 2027	50,000	50,000	40,000
FY 2028	30,000	30,000	30,000
FY 2029	50,000	50,000	40,000
FY 2030	10,000	10,000	15,000
FY 2031	10,000	10,000	10,000
FY 2032	10,000	10,000	10,000
FY 2033	0	0	10,000
FY 2034	0	0	10,000
FY 2035	0	0	10,000
Total TEC	**300,000**	**300,000**	**300,000**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	1,000	1,000	500
FY 2024	2,000	2,000	1,000
FY 2025	1,000	1,000	500
FY 2026	1,000	1,000	500
FY 2027	5,000	5,000	3,000
FY 2028	5,000	5,000	3,000
FY 2029	10,000	10,000	5,000
FY 2030	20,000	20,000	5,000
FY 2031	20,000	20,000	15,000
FY 2032	10,000	10,000	20,000
FY 2033	0	0	10,000
FY 2034	0	0	10,000
FY 2035	0	0	1,500
Total, OPC	**75,000**	**75,000**	**75,000**
Total Project Costs (TPC)			
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	21,000	21,000	500
FY 2024	42,000	42,000	36,000
FY 2025	51,000	51,000	40,500
FY 2026	31,000	31,000	50,500
FY 2027	55,000	55,000	43,000
FY 2028	35,000	35,000	33,000
FY 2029	60,000	60,000	45,000
FY 2030	30,000	30,000	20,000
FY 2031	30,000	30,000	25,000
FY 2032	20,000	20,000	30,000
FY 2033	0	0	20,000
FY 2034	0	0	20,000
FY 2035	0	0	11,500
Total TPC	**375,000**	**375,000**	**375,000**

4. Details of Project Cost Estimate[a]

Overall Project (21-D-511-01 through 21-D-511-05)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	1,515,492	1,380,000	N/A
Contingency	170,896	170,896	N/A
Total Design	**1,686,388**	**1,550,896**	**N/A**
Construction			
Site Preparation	495,000	465,000	N/A
Equipment	807,500	762,500	N/A
Construction	4,007,008	4,262,500	N/A
Contingency	1,319,766	1,289,766	N/A
Total Construction	**6,629,274**	**6,779,766**	**N/A**
Other TEC (if any)			
Cold Startup	436,104	426,104	N/A
Contingency	168,000	163,000	N/A
Total, Other TEC	604,104	589,104	N/A
Total Estimated Cost (TEC)	**8,919,766**	**8,919,766**	**N/A**
Contingency, TEC	***1,658,662***	***1,623,662***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning & Design	300,000	300,000	N/A
Post CD-1 Costs	1,702,234	1,705,234	N/A
Contingency	178,000	175,000	N/A
Total OPC	**2,180,234**	**2,180,234**	**N/A**
Contingency, OPC	*178,000*	*175,000*	*N/A*
Total Project Cost	**11,100,000**	**11,100,000**	**N/A**
Total Contingency (TEC+OPC)	***1,836,662***	***1,798,662***	***N/A***

[a] The subprojects are pre-CD-2, so there are no validated baselines to include in the tables.

USPI Subproject (021-D-511-01)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	85,000	85,000	N/A
Contingency	8,500	8,500	N/A
Total Design	**93,500**	**93,500**	**N/A**
Construction			
Site Preparation	20,000	20,000	N/A
Equipment	20,000	20,000	N/A
Construction	248,500	266,500	N/A
Contingency	100,000	100,000	N/A
Total Construction	**388,500**	**406,500**	**N/A**
Other TEC (if any)			
Cold Startup	40,000	50,000	N/A
Contingency	10,000	10,000	N/A
Total, Other TEC	50,000	60,000	N/A
Total Estimated Cost (TEC)	**532,000**	**560,000**	**N/A**
Contingency, TEC	***118,500***	***118,500***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Post CD-1 OPC Costs	46,000	50,000	N/A
Contingency	8,000	10,000	N/A
Total OPC	**54,000**	**60,000**	**N/A**
Contingency, OPC	*8,000*	*10,000*	*N/A*
Total Project Cost	**586,000**	**620,000**	**N/A**
Total Contingency (TEC+OPC)	***126,500***	***128,500***	***N/A***

MPB Subproject (21-D-511-02)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	1,305,492	1,170,000	N/A
Contingency	148,896	148,896	N/A
Total Design	**1,454,388**	**1,318,896**	**N/A**
Construction			
Site Preparation	400,000	400,000	N/A
Equipment	700,000	700,000	N/A
Construction	3,132,508	3,540,000	N/A
Contingency	1,064,766	1,064,766	N/A
Total Construction	**5,297,274**	**5,704,766**	**N/A**
Other TEC (if any)			
Cold Startup	301,104	301,104	N/A
Contingency	140,000	140,000	N/A
Total, Other TEC	441,104	441,104	N/A
Total Estimated Cost (TEC)	**7,192,766**	**7,464,766**	**N/A**
Contingency, TEC	***1,353,662***	***1,353,662***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning & Design	300,000	300,000	N/A
Post CD-1 OPC Costs	1,416,234	1,485,234	N/A
Contingency	150,000	150,000	N/A
Total OPC	**1,866,234**	**1,935,234**	**N/A**
Contingency, OPC	*150,000*	*150,000*	*N/A*
Total Project Cost	**9,059,000**	**9,400,000**	**N/A**
Total Contingency (TEC+OPC)	***1,503,662***	***1,503,662***	***N/A***

ADMIN Subproject (21-D-511-03)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	5,000	5,000	N/A
Contingency	500	500	N/A
Total Design	**5,500**	**5,500**	**N/A**
Construction			
Site Preparation	5,000	5,000	N/A
Equipment	2,500	2,500	N/A
Construction	34,000	34,000	N/A
Contingency	5,000	5,000	N/A
Total Construction	**46,500**	**46,500**	**N/A**
Other TEC (if any)			
Cold Startup	5,000	5,000	N/A
Contingency	1,000	1,000	N/A
Total, Other TEC	6,000	6,000	N/A
Total Estimated Cost (TEC)	**58,000**	**58,000**	**N/A**
Contingency, TEC	***6,500***	***6,500***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Post CD-1 OPC Costs	20,000	20,000	N/A
Contingency	2,000	2,000	N/A
Total OPC	**22,000**	**22,000**	**N/A**
Contingency, OPC	*2,000*	*2,000*	*N/A*
Total Project Cost	**80,000**	**80,000**	**N/A**
Total Contingency (TEC+OPC)	***8,500***	***8,500***	***N/A***

S&S Subproject (21-D-511-04)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	90,000	90,000	N/A
Contingency	10,000	10,000	N/A
Total Design	**100,000**	**100,000**	**N/A**
Construction			
Site Preparation	20,000	20,000	N/A
Equipment	20,000	20,000	N/A
Construction	240,000	240,000	N/A
Contingency	80,000	80,000	N/A
Total Construction	**360,000**	**360,000**	**N/A**
Other TEC (if any)			
Cold Startup	50,000	50,000	N/A
Contingency	10,000	10,000	N/A
Total, Other TEC	60,000	60,000	N/A
Total Estimated Cost (TEC)	**520,000**	**520,000**	**N/A**
Contingency, TEC	***100,000***	***100,000***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Post CD-1 OPC Costs	100,000	100,000	N/A
Contingency	10,000	10,000	N/A
Total OPC	**110,000**	**110,000**	**N/A**
Contingency, OPC	*10,000*	*10,000*	*N/A*
Total Project Cost	**630,000**	**630,000**	**N/A**
Total Contingency (TEC+OPC)	***110,000***	***110,000***	***N/A***

HFTOC Subproject (21-D-511-05)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	30,000	30,000	N/A
Contingency	3,000	3,000	N/A
Total Design	**33,000**	**33,000**	**N/A**
Construction			
Site Preparation	20,000	20,000	N/A
Equipment	20,000	20,000	N/A
Construction	182,000	182,000	N/A
Contingency	40,000	40,000	N/A
Total Construction	**262,000**	**262,000**	**N/A**
Other TEC (if any)			
Cold Startup	20,000	20,000	N/A
Contingency	2,000	2,000	N/A
Total, Other TEC	22,000	22,000	N/A
Total Estimated Cost (TEC)	**317,000**	**317,000**	**N/A**
Contingency, TEC	***45,000***	***45,000***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Post CD-1 OPC Costs	50,000	50,000	N/A
Contingency	3,000	3,000	N/A
Total OPC	**53,000**	**53,000**	**N/A**
Contingency, OPC	*3,000*	*3,000*	*N/A*
Total Project Cost	**370,000**	**370,000**	**N/A**
Total Contingency (TEC+OPC)	***48,000***	***48,000***	***N/A***

S&F Subproject (21-D-511-06)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	N/A	N/A	N/A
Contingency	N/A	N/A	N/A
Total Design	**N/A**	**N/A**	**N/A**
Construction			
Site Preparation	30,000	N/A	N/A
Equipment	45,000	N/A	N/A
Construction	170,000	N/A	N/A
Contingency	30,000	N/A	N/A
Total Construction	**275,000**	**N/A**	**N/A**
Other TEC (if any)			
Cold Startup	20,000	N/A	N/A
Contingency	5,000	N/A	N/A
Total, Other TEC	**25,000**	**N/A**	**N/A**
Total Estimated Cost (TEC)	**300,000**	**N/A**	**N/A**
Contingency, TEC	***35,000***	***N/A***	***N/A***
Other Project Costs (OPC)			
OPC except D&D			
Post CD-1 OPC Costs	70,000	N/A	N/A
Contingency	5,000	N/A	N/A
Total OPC	**75,000**	**N/A**	**N/A**
Contingency, OPC	*5,000*	*N/A*	*N/A*
Total Project Cost	**375,000**	**N/A**	**N/A**
Total Contingency (TEC+OPC)	***40,000***	***N/A***	***N/A***

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY2022	FY2023	FY 2024	FY 2025	FY2026	FY2027	FY2028	Out Years	Total
FY 2021	TEC	241,896	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	436,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	677,896	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FY 2022	TEC	241,896	445,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	421,213	30,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	663,109	475,000	N/A	N/A	N/A	N/A	N/A	N/A	9,961,891	11,100,000
FY 2023	TEC	241,896	459,000	670,000	828,235	984,508	1,001,339	877,000	N/A	3,857,788	8,919,766
	OPC	421,213	16,000	30,000	30,000	30,000	50,000	75,000	N/A	1,528,021	2,180,234
	TPC	663,109	475,000	700,000	858,235	1,014,508	1,051,339	952,000	N/A	5,385,809	11,100,000
FY 2024	TEC	241,896	459,000	1,170,000	828,235	1,070,000	1,150,000	1,125,000	1,130,500	1,745,135	8,919,766
	OPC	421,213	16,000	30,000	30,000	30,000	50,000	75,000	99,500	1,428,521	2,180,234
	TPC	663,109	475,000	1,200,000	858,235	1,100,000	1,200,000	1,200,000	1,230,000	3,173,656	11,100,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	1Q FY 2032 – 4Q FY 2035
Expected Useful Life (number of years)	50
Expected Future Start of D&D of this capital asset (fiscal quarter)	1Q FY 2082 – 4Q FY 2085

Related Funding Requirements

(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs[a]	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	600	600	48,100	48,100

7. D&D Information

The SRPPF plutonium processing capability will be constructed within the existing partially completed 226-F building. This will require dismantlement and removal of previously installed MFFF equipment and support systems and facilities as necessary to accommodate the new plutonium production mission. Costs for dismantlement and removal of previously installed MFFF equipment will be part of the D&R Subproject.

8. Acquisition Approach

On May 10, 2018, in support of the CD-1, NNSA requested Savannah River (SR) M&O to lead the SRPPF CD-1 Conceptual Design development activities while leveraging the LANL M&O plutonium processing knowledge and ongoing project and operation activities. The SR M&O utilized a LANL subcontract with Merrick to provide the process conceptual design. The SR M&O utilized an affiliate sub-contract relationship with Fluor Inc., located in Greenville S.C., to provide design of the balance of plant systems. The SR M&O was responsible for the nuclear safety and ES&H system conceptual design development while relying on the Physical Security Center of Excellence (PSCOE) from Sandia National Laboratories for the physical security conceptual design.

[a] Current Life Cycle Costs and Annual Costs are based on an updated Life Cycle Cost Estimate performed in January 2021.

In FY 2022, aligning with the CD-1 approved *Acquisition Strategy*, a change in the acquisition approach is being driven due to the DOE decision to extend the Savannah River M&O Contract through 2027 and the slippage in the SRPPF DPB design completion milestone. NNSA has directed the M&O contractor to solicit and award a Construction Management (CM) Contractor to assume all the Engineering, Procurement, and Construction (EPC) responsibilities. Until the award and transition of the new CM contractor, the SRS M&O will continue to manage the sole-source subcontracts with Merrick and Fluor and integrate the PSCOE design to complete the integrated SRPPF design. The SRS M&O and design partners will continue engaging qualified specialty equipment and materials suppliers early in design to improve the quality of design enabling optimum procurements and construction execution. The SRS M&O will be responsible for the project design's constructability and initiate any early construction critical decisions and follow-on execution. Once transition of the EPC activities is complete to the CM contractor, the SRS M&O's remaining responsibilities will be the Facility Design Authority (FDA) for the facility, the production equipment, balance of plant support systems, and nuclear safety and security systems. The SRS M&O is the operational authority and will ensure SRPPF includes operability, maintainability, and sustainability requirements that are flowed down, implemented, and controlled throughout the project execution. As the plutonium program and project integrator, the SRS M&O will be responsible for the program and operational assurance during design, procurement, construction, start-up and properly sequencing of the project operational readiness and transition. LANL will continue to support the FDA by providing process inputs and oversight for specialty process equipment. Lawrence Livermore National Laboratory will also support the FDA and serve as the Weapons Design Agency for the first pit type to be produced at SRS. The SRS M&O contract will include Contract Line-Item Numbers to execute NNSA capital line items at SRS to align the applicable requirements and appropriate incentives to optimize the project execution and completion.

The SRPPF project continues to utilize lessons learned in acquisition and execution of similarly sized nuclear projects, including the execution of the Los Alamos Plutonium Pit Production Project and Y-12 Uranium Processing Facility Project. These lessons learned include:

- early long-lead material and engineered procurements, including gloveboxes, BOP equipment, and bulk materials; and
- early site preparation, to include D&R required to prepare existing SRS facilities for SRPPF CD-2/3 design and construction activities.

The approved CD-1 package identified a multi-subproject construction execution approach. This acquisition approach is continuing to be refined as design matures, along with integration with the national supply chain. Within each subproject, where appropriate, a phasing approach will be applied that may include the following as necessary to optimize project schedule and cash flow:

- early site preparation and installation of temporary facilities / utilities necessary to enable construction mobilization, demolition and removal actions, long lead procurements (i.e., CD-3A);
- performance of independent and usable segments of project scope as subprojects utilizing a "phasing" tailoring strategy approach per DOE O 413.3B, (i.e., a phased subproject that would be managed under its own independent CD-2/3 and CD-4. This will be managed under the CD-1 cost and schedule range, prior to the final CD-2/3 and CD-4 for the overall project).

18-D-690, Lithium Processing Facility
Y-12 National Security Complex, Oak Ridge, Tennessee
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the Lithium Processing Facility (LPF) is $210,770,000. The current Critical Decision (CD)-1 was approved on December 31, 2019, by the Chief Executive for Project Management with a high-end Total Project Cost (TPC) range of $1,645,000,000. Outyear funding amounts may be revised in future budget requests as NNSA baselines the project in accordance with DOE Order 413.3B. A level III Federal Project Director has been assigned.

Significant Changes:
This project is not a new start. The most recent DOE Order 413.3B Critical Decision (CD) was CD-1, approved on December 31, 2019. Based on this approval, in FY 2021 the Architect and Engineering (A/E) subcontract was awarded and the preliminary design effort was initiated. At the end of FY 2023, the design will be approximately 80% complete.

FY 2024 funds will be used for design, CD-3A long-lead and site preparation procurements, and CD-3B long-lead procurements, and oversight.

Preliminary and final design, construction, and Other Project costs (OPC) will continue to be executed through line-item funding specifically appropriated for the project, as started in FY 2021. Prior to FY 2021, OPCs were funded from Capability Based Investments and Lithium Sustainment, except in FY 2018 where funding appropriated under the project funded conceptual design.

During facility preliminary design, the square footage of the LPF facilities increased from 134,000 to 267,000 square feet to meet operational, utility, and safety requirements. The forecasted impacts associated with this increase are within the existing cost and schedule range estimates established at CD-1. NNSA acknowledges there is a possibility in a 5 – 15% increase in the total project cost due to due to current market conditions (e.g., tight labor market, supply chain delays, and inflation) and internal challenges (e.g., integration with aging infrastructure, site utility limitations, synchronization of multiple projects/work-fronts). The project will be able to characterize any impacts associated with current conditions following an updated estimate that will be completed by the end of FY 2023.

Critical Milestone History

Fiscal Quarter or Date[a]

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2019	06/10/2015	01/19/2018	2Q FY 2019	1Q FY 2021	2Q FY 2022	1Q FY 2021	N/A	2Q FY 2027
FY 2020	06/10/2015	02/28/2019	3Q FY 2019	2Q FY 2022	2Q FY 2022	2Q FY 2022	N/A	3Q FY 2027
FY 2021	06/10/2015	02/28/2019	12/31/2019	3Q FY 2024	3Q FY 2024	3Q FY 2024	N/A	4Q FY 2031
FY 2022	06/10/2015	02/28/2019	12/31/2019	1Q FY 2026[b]	2Q FY 2025[c]	1Q FY 2026	N/A	4Q FY 2031
FY 2023	06/10/2015	02/28/2019	12/31/2019	1Q FY 2026	2Q FY 2025	1Q FY 2026	N/A	4Q FY 2031
FY 2024	06/10/2015	02/28/2019	12/31/2019	1Q FY 2026	2Q FY 2025	1Q FY 2026	N/A	4Q FY 2031

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range.
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable).
CD-1 – Approve Alternative Selection and Cost Range

[a] Project schedules are estimates until the project baseline is approved at CD-2.
[b] CD-2 and CD-3 dates adjusted to include addition of schedule contingency previously omitted from CPDS.
[c] Final Design Completion date adjusted to include addition of schedule contingency previously omitted from CPDS.

CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction
D&D Complete –Completion of D&D work
CD-4 – Approve Start of Operations or Project Complete

Fiscal Year	CD-3A
FY 2019	N/A
FY 2020	4Q FY 2021
FY 2021	4Q FY 2022
FY 2022	4Q FY 2023
FY 2023	4Q FY 2023
FY 2024	4Q FY 2023

CD-3A – Long-Lead Procurements and Site Preparation – Long-lead procurements consist of critical equipment such as lathes, mills, and presses. Site preparation work includes demolition of slabs and underground utilities; removal of unsuitable soils and backfill; and installation of site access controls, water drainage features, retention basins, and temporary facilities. The current estimate range is $210.0 to $250.0 million. A detailed estimate will be finalized prior to CD-3A approval in September 2023.

Fiscal Year	CD-3B
FY 2024	3QFY 2024

CD-3B – Long-Lead Procurements – Long-lead procurements consist of critical equipment/material such as electrical transformers, specialized gloveboxes, foundation piles, and bulk construction material. Over the next 18 months, the CD-3B scope will be refined and a detailed estimate will be finalized.

Project Cost History[a]

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC Except D&D	OPC, D&D	OPC, Total	TPC
FY 2019	120,000	530,000	650,000	70,000	0	70,000	720,000
FY 2020	125,000	525,000	650,000	70,000	0	70,000	720,000
FY 2021	384,000	1,161,000	1,545,000	100,000	0	100,000	1,645,000
FY 2022	384,000	1,161,000	1,545,000	100,000	0	100,000	1,645,000
FY 2023	384,000	1,161,000	1,545,000	100,000	0	100,000	1,645,000
FY 2024	384,000	1,161,000	1,545,000	100,000	0	100,000	1,645,000

2. Project Scope and Justification

Scope

The LPF project will design and construct a new facility, at the former Biology complex site on Y-12, to relocate lithium operations and processes currently in Y-12's Building 9204-2 into a safe, reliable, modern building. LPF will be approximately 267,000 SF in size. It will be designed with space for lithium process equipment, shipping and receiving areas, in-process storage areas, and technical and administrative support areas. The LPF project plans to pursue approval of a CD-3A for the long lead scope and site preparation. Long-lead procurements consist of critical equipment such as lathes, mills, and presses. Site preparation work includes demolition of slabs and underground utilities; removal of unsuitable soils and backfill; and installation of site access controls, water drainage features, retention basins, and temporary facilities. Due to ongoing supply chain concerns and to allow time for greater design maturity, a CD-3B long-lead procurement has been added in FY 2024 for additional critical equipment/material such as electrical transformers, specialized gloveboxes,

[a] Project costs are estimates until the project baseline is approved at CD-2.

foundation piles, and bulk construction material. The project cost estimate and funding profile may be revised in future budget requests prior to CD-2 to account for improved definition of the design, schedule, and/or risks. Funds appropriated under this data sheet may be used for contracted support services to the Federal Project Director and to conduct reviews of design and construction.

Justification

Lithium is an essential element for the refurbishment and modernization of the nuclear weapons stockpile. To support Defense Programs missions, Y-12 maintains capabilities and facilities for the production of lithium components. In addition to supporting Defense Programs missions, lithium capabilities support international agreements, the NNSA Nuclear Smuggling Detection and Deterrence program, the Department of Homeland Security Countering Weapons of Mass Destruction Office, and the Department of Energy (DOE) Office of Science Isotope Program.

Production work for lithium and related nonnuclear special materials vital to canned subassemblies is performed in Building 9204-2, which was built in 1943. The facility is oversized for today's mission, is costly to operate, has many operating issues, and has exceeded its expected life. Despite short-term investments to sustain capabilities, conditions in Building 9204-2 remain poor, in part due to a significant amount of deferred maintenance. As an example of impact and concern, the Senate Armed Service Committee in the National Defense Authorization Act of Fiscal Year 2015, acknowledged that: "Portions of the concrete ceiling above equipment that supplies components to the stockpile are spalling as the rebar inside the 60-plus-year-old concrete has corroded due to a desiccant used in the air handling system. Such working conditions are unacceptable if not dangerous." In order to ensure continuity of lithium capabilities, reduce annual operating costs, and increase process efficiencies using safer, more modern, agile, and responsive processes, a new facility must be built. A project specific Analysis of Alternatives (AoA) was completed in 2017. Key evaluation criteria included life-cycle cost, capacity, complexity, schedule, safety, and impact on existing operations. Off-site real estate surveys and facilities assessments were completed and no suitable facilities were identified, therefore the selected preferred alternative was to build a new facility. Due to cost growth between CD-0 and CD-1, primarily due to industrial/process space and office space allocations growth, DOE Cost Estimating and Program Evaluation (CEPE) was prompted to reexamine the AoA. After completing the AoA reexamination process, NNSA leadership re-affirmed the selection of building a new facility.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. Project risk assessment was conducted as part of the CD-1 approval process. Risk management assessments and updates continue as part of the project management. Also, consistent with DOE O 413.3B, earned value information for the LPF design effort will be reported in the Project Assessment and Reporting System (PARS). Funding specifically appropriated for the LPF project may also be used for contracted support services to the Federal Project Director and to conduct reviews of design and construction of the LPF.

Preliminary Key Performance Parameters (KPPs)

The threshold KPPs represent the minimum acceptable performance that the project must achieve. These thresholds are presented with increased detail in the classified Project Requirements Document (PRD). Achievement of the threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The objective KPPs, also detailed in the PRD, represent the desired project performance.

Performance Measure[a]	Threshold	Objective
Demonstrate capacity to process and produce sufficient lithium material and manufacture sufficient lithium components to meet projected weapons program demands	Threshold Performance Parameters are identified in the Classified Project Requirements Document	Objective Performance Parameters are identified in the Classified Project Requirements Document

[a] Key Performance Parameters will be approved upon approval of the project baseline.

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2019	19,000	19,000	6,570
FY 2020	32,000	19,000	7,736
FY 2021	99,405	99,405	29,233
FY 2022	164,902	164,902	60,503
FY 2023	63,693	76,693	123,000
FY 2024	5,000	5,000	91,000
FY 2025	0	0	65,958
Total Design	**384,000**	**384,000**	**384,000**
Construction			
FY 2023	150,193	140,000	10,000
FY 2024	195,770	195,770	130,000
FY 2025	264,000	264,000	183,000
FY 2026	270,000	270,000	295,000
FY 2027	263,000	263,000	296,000
FY 2028	18,037	28,230	186,000
FY 2029	0	0	51,000
FY 2030	0	0	10,000
FY 2031	0	0	0
Total Construction	**1,161,000**	**1,161,000**	**1,161,000**
TEC			
FY 2019	19,000	19,000	6,570
FY 2020	32,000	19,000	7,736
FY 2021	99,405	99,405	29,233
FY 2022	164,902	164,902	60,503
FY 2023	213,886	216,693	133,000
FY 2024	200,770	200,770	221,000
FY 2025	264,000	264,000	248,958
FY 2026	270,000	270,000	295,000
FY 2027	263,000	263,000	296,000
FY 2028	18,037	28,230	186,000
FY 2029	0	0	51,000
FY 2030	0	0	10,000
FY 2031	0	0	0
Total TEC	**1,545,000**	**1,545,000**	**1,545,000**

($K)	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2015[a]	497	497	88
FY 2016	247	247	637
FY 2017	4,680	4,680	572
FY 2018	5,000	3,661	4,527
FY 2019	0	0	3,261
FY 2020	1,000	1,000	0
FY 2021	10,000	10,000	979
FY 2022	3,000	3,000	6,971
FY 2023	3,000	3,000	9,000
FY 2024	10,000	11,339	10,000
FY 2025	16,000	16,000	10,000
FY 2026	20,000	20,000	8,000
FY 2027	22,000	22,000	11,000
FY 2028	4,576	4,576	17,000
FY 2029	0	0	9,000
FY 2030	0	0	5,720
FY 2031	0	0	3,245
Total, OPC	**100,000**	**100,000**	**100,000**
Total Project Costs (TPC)			
FY 2015	497	497	88
FY 2016	247	247	637
FY 2017	4,680	4,680	572
FY 2018	5,000	3,661	4,527
FY 2019	19,000	19,000	9,831
FY 2020	33,000	20,000	7,736
FY 2021	109,405	109,405	30,212
FY 2022	167,902	167,902	67,474
FY 2023	216,886	219,693	142,000
FY 2024	210,770	212,109	231,000
FY 2025	280,000	280,000	258,958
FY 2026	290,000	290,000	303,000
FY 2027	285,000	285,000	307,000
FY 2028	22,613	32,806	203,000
FY 2029	0	0	60,000
FY 2030	0	0	15,720
FY 2031	0	0	3,245
Total TPC	**1,645,000**	**1,645,000**	**1,645,000**

[a] OPC funding in FY 2015-2017 was funded out of Capability Based Investments.

4. Details of Project Cost Estimate

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	306,000	306,000	TBD
Federal Design Support	18,000	18,000	TBD
Contingency	60,000	60,000	TBD
Total Design	**384,000**	**384,000**	**TBD**
Construction			
Site Work	25,045	25,045	TBD
Equipment	417,939	417,939	TBD
Construction	434,018	434,018	TBD
Federal Design Support	28,000	28,000	TBD
Project Management	66,628	66,628	TBD
Contingency	189,370	189,370	TBD
Total Construction	**1,161,000**	**1,161,000**	**TBD**
Total Estimated Cost (TEC)	**1,545,000**	**1,545,000**	**TBD**
Contingency, TEC	*249,370*	*249,370*	*TBD*
Other Project Costs (OPC)			
OPC except D&D			
R&D	23,389	23,389	TBD
Conceptual Planning	7,085	7,085	TBD
Conceptual Design	4,218	4,218	TBD
Other OPC Costs (Startup, ES&H, etc.)	47,698	47,698	TBD
Contingency	17,610	17,610	TBD
Total OPC	**100,000**	**100,000**	**TBD**
Contingency, OPC	*17,610*	*17,610*	*TBD*
Total Project Cost	**1,645,000**	**1,645,000**	**TBD**
Total Contingency (TEC+OPC)	***266,980***	***266,980***	***TBD*** [a]

[a] Project is Pre-CD-2, therefore no baseline has been set and the Original Validated Baseline value is not applicable.

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY2022	FY2023	FY 2024	FY 2025	FY2026	FY2027	FY2028	Out Years	Total
FY 2019	TEC	77,200	125,900	201,600	200,000	45,300	0	0	0	0	650,000
	OPC	12,369	1,000	1,000	11,936	13,663	17,032	13,000	0	0	70,000
	TPC	89,569	126,900	202,600	211,936	58,963	17,032	13,000	0	0	720,000
FY 2020	TEC	82,200	125,900	191,600	217,728	32,572	0	0	0	0	650,000
	OPC	11,074	1,000	1,000	12,236	16,563	18,132	9,995	0	0	70,000
	TPC	93,274	126,900	192,600	229,964	49,135	18,132	9,995	0	0	720,000
FY 2021	TEC	150,405	218,902	223,012	250,770	245,312	251,000	147,000	0	58,599	1,545,000
	OPC	21,424	3,000	3,000	10,000	16,000	20,000	22,000	0	4,576	100,000
	TPC	171,829	221,902	226,012	260,770	261,312	271,000	169,000	0	63,175	1,645,000
FY 2022	TEC	150,405	164,902	TBD	TBD	TBD	TBD	TBD	0	1,229,693	1,545,000
	OPC	21,424	3,000	TBD	TBD	TBD	TBD	TBD	0	75,576	100,000
	TPC	171,829	167,902	TBD	TBD	TBD	TBD	TBD	0	1,305,269	1,645,000
FY 2023	TEC	150,405	164,902	213,886	250,770	264,000	270,000	228,000	0	3,037	1,545,000
	OPC	21,424	3,000	3,000	10,000	16,000	20,000	22,000	0	4,576	100,000
	TPC	171,829	167,902	216,886	260,770	280,000	290,000	250,000	0	7,613	1,645,000
FY 2024	TEC	150,405	164,902	213,886	200,770	264,000	270,000	263,000	18,037	0	1,545,000
	OPC	21,424	3,000	3,000	10,000	16,000	20,000	22,000	4,576	0	100,000
	TPC	171,829	167,902	216,886	210,770	280,000	290,000	285,000	22,613	0	1,645,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	4Q FY 2031
Expected Useful Life	50 years
Expected Future Start of D&D of this capital asset	4Q FY 2081

Related Funding requirements

(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	33	33	1,669	1,669

7. D&D Information

The location for the new facility is the former Biology Complex site at Y-12; however, D&D of the existing facilities is being funded and managed by DOE's Office of Environmental Management through its Y-12 Excess Facilities D&D program. Building 9204-2 houses operations in addition to lithium production, and the plan for the transition of those operations to other facilities is yet to be decided. Once all capabilities have been moved out of Building 9204-2, final D&D of existing facilities will be the responsibility of the DOE Office of Environmental Management.

8. Acquisition Approach

NNSA has contracted with the M&O to award multiple subcontracts of various types. Primary design effort, through the end of the project, will be accomplished via a cost-plus award fee subcontract to an Architect/Engineering firm. Various firm fixed price subcontracts, with a firm fixed price option to fabricate, will be used for most of the specialized process equipment design and procurement. Specific to the machining lathe/mill complex prototype, a cost-plus incentive fee subcontract will be used for design phase with an optional firm fixed price for fabrication. The project will utilize Construction Manager at Risk (CMR) services. The first phase, providing constructability reviews and providing cost saving design/construction recommendations, will be via a time and materials subcontract. The second phase will be an optional firm fixed price subcontract for the construction of the LPF facility. As allowed by Order 413.3B, Change 6, the project scope may seek CD-3A/B approvals for site preparation and long lead procurements.

15-D-302, TA-55 Reinvestment Project (TRP) Phase III
Los Alamos National Laboratory (LANL), Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the TA-55 Reinvestment Project Phase III is $30,000,000 of Total Estimated Cost (TEC) funding and $11,808,000 of Other Project Costs (OPC). The TEC baseline is $188,887,000 and the Total Project Cost (TPC) baseline is $236,030,000.

Significant Changes:

The TA-55 Reinvestment Project was initiated in FY 2005 and subsequently split into three phases.

The FY 2024 Construction Project Data Sheet (CPDS) is an update from FY 2023 and does not include a new start for the budget year. The most recent Critical Decision (CD) for the project is a combined CD-1/2/3 to approve the alternative selection, performance baseline, and authorization of construction which was approved on May 6, 2021. A DOE Independent Cost Estimate and External Independent Review were completed in August and October 2020 respectively to support the approval of the Performance Baseline. The TPC estimate approved at CD-1/2/3 is shown below and approved by the Project Management Executive per DOE Order 413.3B. The performance baseline was established at the 85% confidence level. FY 2024 funding will be used to continue construction. The pace at which construction and turnover to operations can be executed is limited by the work being performed in an operating nuclear facility that is required to support critical program deliverables during the execution of this project. These considerations were validated during the NNSA review and approval of the CD-1/2/3 package and are reflected in the CD-4 date which is forecasted for the 3rd quarter of FY 2027.

The Baseline is reflective of CD-1/2/3 package and consistent with the scope selection from the Federal Analysis of Alternatives (AoA), final design, lessons learned, and input from the Independent Cost Estimate and External Independent Reviews.

A Federal Project Director, level 3 has been appointed to this project.

The Project is currently experiencing cost and schedule impacts based on issues of craft availability and productivity as NNSA and LANL prioritize resources to support mission execution. The project is unable to acquire sufficient, qualified, and cleared staff to prosecute the work as planned or according to the recovery schedule established in June 2022. The recovery schedule required 31 electricians on average per day, and over the last nine months the project has averaged six per day. The project implemented some improvements in labor and material access to improve efficiency, but the lower priority of this project compared to others in PF-4 continues to retard performance. Project subcontracted work occurring outside of PF-4 is experiencing better staffing and productivity and is not driving the critical path. Labor availability issues are not expected to resolve when additional LAP4 subprojects ramp up construction activities. Based on these factors, the project cost may increase by 10% to 20% and could extend the schedule by 0 to 1 year. Recognizing the difficulty of working within PF-4, the project included considerable schedule margin in the original baseline. The Federal Project Director is evaluating how these impacts might affect the performance baseline. Any performance baseline updates will be incorporated into the CPDS as they become available.

Critical Milestone History[a]

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2015	03/23/2005		1Q FY 2015	4Q FY 2017	2Q FY 2018	2Q FY 2018	N/A	4Q FY 2022
FY 2016	03/23/2005	12/23/2014	4Q FY 2016	4Q FY 2018	2Q FY 2018	4Q FY 2018	N/A	3Q FY 2026
FY 2017	03/23/2005	12/23/2014	4Q FY 2016	4Q FY 2018	2Q FY 2018	4Q FY 2018	N/A	4Q FY 2025
FY 2021	03/23/2005	11/15/2018	3Q FY 2021	3Q FY 2021	4Q FY 2020	3Q FY 2021	2Q FY 2024	2Q FY 2026
FY 2022	03/23/2005	11/15/2018	5/06/2021	5/06/2021	1/22/2021	5/06/2021	2Q FY 2025	3Q FY 2027
FY 2023	03/23/2005	11/15/2018	5/06/2021	5/06/2021	1/22/2021	5/06/2021	2Q FY 2025	3Q FY 2027
FY 2024	03/23/2005	11/15/2018	5/06/2021	5/06/2021	1/22/2021	5/06/2021	2Q FY 2025	3Q FY 2027

CD-0 – Approve Mission Need
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Project Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work (see Section 9)
CD-4 – Approve Start of Operations or Project Completion

Project Cost History[b]

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2015	30,062	110,000	140,062	29,500	N/A	29,500	169,562
FY 2016	30,060	150,002	180,062	46,500	N/A	46,500	226,562
FY 2017	30,060	111,448	141,508	31,500	N/A	31,500	173,008
FY 2021	35,628	155,104	190,732	34,658	12,808	47,466	238,198
FY 2022	22,435	166,452	188,887	44,778	2,365	47,143	236,030
FY 2023	19,184[c]	169,703	188,887	44,778	2,365	47,143	236,030
FY 2024	19,184	169,703	188,887	44,778	2,365	47,143	236,030

2. Project Scope and Justification

Scope

The TRP III scope encompasses replacing the currently outdated LANL Technical Area (TA)-55 fire alarm system that is not compliant with current codes and standards. Specifically, the existing detection, control, and evacuation devices associated with the fire alarm system are not National Fire Protection Association (NFPA) or Americans with Disabilities Act (ADA) compliant and are not Underwriters Laboratories (UL) listed. All major components of the system are obsolete and difficult to maintain. Spare part availability has continued to be a significant concern as circuit boards for the main fire alarm control panel are no longer available.

[a] Critical milestone history reflects no milestones in FY 2018, FY 2019 and FY 2020 since no CPDS or budget requests were submitted in these years.
[b] Project cost history reflect no values in FY 2018, FY 2019 and FY 2020 since no CPDS or budget requests were submitted in these years.
[c] TEC design activities were completed for $3.251 million less than the baselined value $22.435 million. The budget under-run was reallocated to Federal construction contingency during the implementation of the performance baseline.

The current single fire alarm control panel will be replaced with multiple panels; separating the nuclear facility, Plutonium Facility (PF)-4, and the non-nuclear facilities within the TA-55 site. The scope also includes addition of area-wide and early warning fire detection throughout PF-4, installation of Underwriter Laboratory (UL) listed digital/addressable components, sprinkler flow sensing switches, new evacuation strobes and audible alarms, consolidated monitoring of the campus in the TA-55 Operations Center, and other components to provide inputs from over 2,000 devices spread throughout 199 zones of protection in TA-55. All new systems must be installed and accepted into operation while existing systems continue to provide alarm functions for the operating facility.

Upon completion of the new system, the project includes decommissioning and decontamination of components of the old systems. Demolition involves appropriate radiation protection and waste management characterization of the areas and parts to be removed.

Justification

PF-4 within TA-55 is the only Hazard Category 2 (HC-2) nuclear facility/Security Category 1 (SC-1) supporting all enduring Plutonium missions for Department of Energy (DOE)/NNSA at this time. The mission need for TRP III is to extend the life of TA-55 so it can continue to operate safely and reliably in support of the stockpile stewardship program. This project specifically extends the life of TA-55 by recapitalizing and revitalizing an aging and obsolete fire alarm system.

The TA-55 main fire control panel and supporting devices represent a single point failure risk for this critical capability. More specifically, this facility is critical to support certification of the stockpile, pit production, and all other DOE/NNSA plutonium missions. PF-4 has been in operation for over 35 years and, before the TRP I and TRP II upgrades, the infrastructure and systems were aging and approaching the end of their service life, required excessive maintenance, and experienced increased operating costs and reduced system reliability. The facility is not in compliance with safety and regulatory requirements that are required for the fire alarm systems. TRP III is the final phase of the three-phase project that supports critical upgrades of PF-4 within the TA-55 boundary at LANL.

Portions of the funds appropriated under this data sheet may be used for contracted support services to the Federal Project Director to conduct independent assessments of the planning and execution of this project required by DOE Order 413.3B and to conduct technical reviews of design and construction documents.

The project is being conducted in accordance with the project management requirements in DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*.

Key Performance Parameters (KPPs)

The Threshold KPPs, represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The Objective KPPs represent the desired project performance.

Performance Measure[a]	Threshold KPP	Objective KPP
New PF-4 fire alarm system (FAS)	**T1:** New FAS is installed and accepted into operations for PF-4	**O1:** New FAS is installed and accepted into operations for Balance of Plant
	T2: All data points cutover from old system to the new system as required per baseline design	**O2:** All Balance of Plant data points cutover from old system to the new system as required per baseline design

[a] Key Performance Parameters approved per CD-1/2/3.

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	16,062	16,062	0
FY 2016 [a]	6,373	8,192	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	1,503
FY 2020	0	-1,819	12,506
FY 2021[b]	-3,251	-3,251	5,175[c]
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
Total Design	**19,184**	**19,184**	**19,184**
Construction			
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	0	0	0
FY 2016	10,003	10,003	0
FY 2017	2,000	2,000	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	33,251[d]	33,251	7,762

[a] In FY 2020 there was reprogramming of $1.82 million of the FY 2016 appropriation to the LANL TA-3 Substation replacement, 16-D-621.
[b] TEC design activities were completed for $3.251 million less than the baselined value $22.435 million. The budget under-run was reallocated to contingency per the performance baseline.
[c] Final design financial closeout was completed in the first quarter of FY 2022 that resulted in a cost reduction of $19 thousand. This reduction was applied against the FY 2021 appropriation.
[d] TEC reflected appropriation of $30 million plus funding reallocated at the completion of design - $3.251 million.

($K)	Budget Authority (Appropriations)	Obligations	Costs
FY 2022	27,000	27,000	39,379
FY 2023	30,002	30,002	46,279
FY 2024	30,000	30,000	38,836
FY 2025	34,475	34,475	30,000
FY 2026	2,000	2,000	6,475
FY 2027	0	0	0
Total Construction	**168,731**	**168,731**	**168,731**
TEC			
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	16,062	16,062	0
FY 2016[a]	16,376	18,195	0
FY 2017	2,000	2,000	0
FY 2018	0	0	0
FY 2019	0	0	1,503
FY 2020	0	-1,819	12,506
FY 2021	30,000	30,000	12,937
FY 2022	27,000	27,000	39,379
FY 2023	30,002	30,002	46,279
FY 2024	30,000	30,000	38,836
FY 2025	34,475	34,475	30,000
FY 2026	2,000	2,000	6,475
FY 2027	0	0	0
Total TEC	**187,915**	**187,915**	**187,915**
Other Project Costs (OPC)			
OPC except D&D			
FY 2013	1,675	1,675	1,675
FY 2014	750	750	750
FY 2015	1,802	1,802	1,802
FY 2016	133	133	133
FY 2017	828	828	828
FY 2018	3,596	3,596	3,596
FY 2019	1,804	1,804	1,775
FY 2020[b]	500	500	-6
FY 2021	2,000	2,000	174
FY 2022	5,000	5,000	3,036

($K)	Budget Authority (Appropriations)	Obligations	Costs
FY 2023	10,900	10,900	10,037
FY 2024	9,543	9,543	8,258
FY 2025	5,700	5,700	8,215
FY 2026	547	547	3,000
FY 2027	0	0	1,505
Total, OPC except D&D	44,778	44,778	44,778
OPC D&D			
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	0	0	0
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	100	100	79
FY 2024	2,265	2,265	2,286
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
Total, OPC D&D	2,365	2,365	2,365
Total OPC			
FY 2013	1,675	1,675	1,675
FY 2014	750	750	750
FY 2015	1,802	1,802	1,802
FY 2016	133	133	133
FY 2017	828	828	828
FY 2018	3,596	3,596	3,596
FY 2019	1,804	1,804	1,775
FY 2020	500	500	-6
FY 2021	2,000	2,000	174
FY 2022	5,000	5,000	3,036
FY 2023	11,000	11,000	10,116
FY 2024	11,808	11,808	10,544
FY 2025	5,700	5,700	8,215
FY 2026	547	547	3,000
FY 2027	0	0	1,505
Total, OPC	**47,143**	**47,143**	**47,143**

[a] In FY 2020 there was reprogramming of $1.82 million of the FY 2016 appropriation to the LANL TA-3 Substation replacement, 16-D-621.

[b] No OPC funding was provided in FY 2020. The required OPCs were added in FY 2022.

($K)			
	Budget Authority (Appropriations)	Obligations	Costs
Total Project Costs (TPC)			
FY 2013	1,675	1,675	1,675
FY 2014	750	750	750
FY 2015	17,864	17,864	1,802
FY 2016	16,509	18,328	133
FY 2017	2,828	2,828	828
FY 2018	3,596	3,596	3,596
FY 2019	1,804	1,804	3,278
FY 2020	500	-1,319	12,500
FY 2021	32,000	32,000	13,111
FY 2022	32,000	32,000	42,415
FY 2023	41,002	41,002	56,395
FY 2024	41,808	41,808	49,380
FY 2025	40,175	40,175	38,215
FY 2026	2,547	2,547	9,475
FY 2027	0	0	1,505
Total TPC	**235,058**	**235,058**	**235,058**

4. **Details of Project Cost Estimate**

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	18,884	18,884	22,135
Federal Design Support	300	300	300
Contingency	0	0	0
Total Design [a]	**19,184**	**19,184**	**22,435**
Construction			
Construction	111,499	111,499	111,499
Federal Support	5,239	5,239	5,239
Contingency	52,965	52,965	49,714
Total Construction	**169,703**	**169,703**	**166,452**
Total Estimated Cost (TEC)	**188,887**	**188,887**	**188,887**
Contingency, TEC	*52,965* [a]	*52,965*	*49,714*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	8,885	8,885	8,885
Conceptual Design	1,668	1,668	1,668
Start-Up	9,405	9,405	9,405
Project Support	14,541	14,541	14,541
Federal Support	1,160	1,160	1,160
Contingency	9,119	9,119	9,119
Total, OPC except D&D	44,778	44,778	44,778
OPC D&D			
OPC D&D	2,365	2,365	2,365
Total, OPC D&D	2,365	2,365	2,365
Total OPC	**47,143**	**47,143**	**47,143**
Contingency, OPC	*9,119*	*9,119*	*9,119*
Total Project Cost	**236,030**	**236,030**	**236,030**
Total Contingency (TEC+OPC)	***62,084***	***62,084***	***58,833***

[a] TEC design activities were completed for $3.251 million less than the baselined value $22.435 million. The budget under-run was reallocated to Federal construction contingency during the implementation of the performance baseline.

5. Schedule of Appropriation Requests

($K)

Request Year	Type	Prior Years	FY2022	FY2023	FY 2024	FY 2025	FY2026	FY2027	FY2028	Out Years	Total
FY 2015	TEC	140,062	0	0	0	0	0	0	0	0	140,062
	OPC	28,500	2,000	1,000	0	0	0	0	0	0	29,500
	TPC	168,562	2,000	1,000	0	0	0	0	0	0	169,562
FY 2016	TEC	140,062	30,554	20,000	15,000	5,000	0	0	0	0	180,062
	OPC	25,500	3,000	3,000	3,000	5,000	6,000	4,000	0	0	46,500
	TPC	165,562	33,554	23,000	18,000	10,000	6,000	4,000	0	0	226,562
FY 2017	TEC	109,508	0	32,000	0	0	0	0	0	0	141,508
	OPC	23,500	3,000	3,000	3,000	2,000	0	0	0	0	31,500
	TPC	133,008	3,000	35,000	3,000	2,000	0	0	0	0	173,008
FY 2021	TEC	66,257	30,000	30,000	30,000	30,000	34,475	0	0	0	190,732
	OPC	14,588	2,000	3,000	11,000	11,808	4,000	3,070	0	0	47,466
	TPC	80,845	32,000	33,000	41,000	41,808	38,475	3,070	0	0	238,198
FY 2022	TEC	64,437	30,000[a]	27,000	TBD	TBD	TBD	TBD	TBD	97,450	188,887
	OPC	13,088	2,000	5,000	TBD	TBD	TBD	TBD	TBD	29,055	47,143
	TPC	77,525	32,000	32,000	TBD	TBD	TBD	TBD	TBD	126,505	236,030
FY 2023	TEC	64,438	30,000	27,000	30,002	30,000	34,474	2,000	0	0	187,914
	OPC	13,088	2,000	5,000	11,000	11,808	5,700	547	0	0	47,143
	TPC	77,526	32,000	32,000	41,002	41,808	40,174	2,547	0	0	235,057
FY 2024	TEC	64,438	27,000	30,002	30,000	34,475	2,000	0	0	0	187,915
	OPC	13,088	5,000	11,000	11,808	5,700	547	0	0	0	47,143
	TPC	77,526	32,000	41,002	41,808	40,175	2,547	0	0	0	235,058

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	3Q FY 2027
Expected Useful Life (number of years)	25 years
Expected Future Start of D&D of this capital asset (fiscal quarter)	3Q FY 2052

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	**Current Total Estimate**	**Previous Total Estimate**	**Current Total Estimate**
Operations and Maintenance	N/A	N/A	N/A	N/A

[a] The decrease in the prior year TEC funding is the result of an FY 2020 reprogramming of $1.82 million of the FY 2016 appropriation to the LANL TA-3 Substation replacement 16-D-621.

7. D&D Information

There is no new area being constructed in this construction project, but the old system will be removed.

8. Acquisition Approach

The TRP III acquisition strategy assigns project execution to the LANL Management and Operating (M&O) Contractor. The final design was issued through a firm fixed price subcontract. Construction activities will be self-performed by the M&O Contractor for PF-4 scope and can be subcontracted for the Balance of Plant scope.

15-D-301 High Explosive Science and Engineering (HESE) Facility
Pantex Plant, Amarillo, Texas
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the High Explosive Science and Engineering (HESE) Facility is $101,356,000. The most recent DOE O 413.3B approved Critical Decisions (CD) are CD-3A, *Approve Site Preparation and Long Lead Procurement*, with a cost of $23,300,000 and a completion of 2nd Quarter FY 2023 and CD-2/3, *Approve Performance Baseline and Start of Construction*, with a Total Project Cost (TPC) of $228,000,000 and a CD-4 date of November 2027. The construction contract awards occurred in April 2022.

The Performance Baseline was informed by an Independent Cost Estimate (ICE) and an External Independent Review (EIR) that were completed by the Department of Energy Office of Project Management in June 2020 and were supplemented prior to CD-2/3 approval. The FY 2024 Request includes funds to continue the construction of the facility and to begin document preparation for the readiness assessment activities.

While Congress appropriated funds for OPC in a separate "HESE OPC" control in FY 2021, funds for OPCs are included as part of the High Explosives and Energetics program in FY 2024 and 2025 of the FY 2024-2028 FYNSP.

Significant Changes:
This Construction Project Data Sheet (CPDS) is an update of the Fiscal Year (FY) 2023 CPDS and does not include a new start for the budget year. The additional funding requested in this CPDS reflects some execution challenges that have developed during construction, such as the termination and re-procurement of the site work subcontractor and the discovery of a design error in the High Explosive Blast Laboratory walls. A comprehensive estimate at completion is in development and the initial results have informed this budget request, but NNSA has not yet completed its formal review of the contractor's information. The TPC shown is a preliminary estimate included until a baseline change proposal, informed by the required Independent Cost Estimate, is completed.

A Federal Project Director is currently assigned to this project.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year[a]	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2015	11/22/2011	N/A	4Q FY 2014	4Q FY 2015	3Q FY 2016	4Q FY 2016	3Q FY 2020	3Q FY 2020
FY 2016	11/22/2011	1/9/2015	1/09/2015	1Q FY 2018	4Q FY 2017	1Q FY 2018	3Q FY 2023	4Q FY 2023
FY 2020	11/22/2011	1/9/2015	1/09/2015	3Q FY 2020	2Q FY 2020	3Q FY 2020	3Q FY 2025	4Q FY 2025
FY 2021	11/22/2011	1/9/2015	1/09/2015	4Q FY 2020	3Q FY 2020	4Q FY 2020	3Q FY 2025	4Q FY 2025
FY 2023	11/22/2011	1/9/2015	1/09/2015	4/13/2022	8/17/2020	4/13/2022	N/A	1Q FY 2028
FY 2024	11/22/2011	1/9/2015	1/09/2015	4/13/2022	8/17/2020[b]	4/13/2022	N/A	1Q FY 2028

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)

[a] Funding requests were not submitted in fiscal years 2017, 2018, 2019, and 2022.
[b] The final design was completed on 7/27/2018, but this represents the completion of design revalidation.

CD-3 – Approve Start of Construction
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Year	Performance Baseline Validation	CD-3A
FY 2023	4/12/2022	10/30/2020
FY 2024	4/12/2022	10/30/2020

CD-3A – Approve Site Preparation and Long-Lead Procurement

Project Cost History

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2015	11,800	60,500	72,300	6,100	18,600	24,700	97,000
FY 2016	14,249	83,051	97,300	21,055	36,124	57,179	154,479
FY 2020	15,372	119,900	135,272	12,025	48,200	60,225	195,497
FY 2021	15,372	119,900	135,272	12,025	48,200	60,225	195,497
FY 2023	18,497	195,131	213,628	14,372	N/A	14,372	228,000
FY 2024	18,497	238,131	256,628	12,585	N/A	12,585	269,213[a]

2. Project Scope and Justification

Scope[b]

The project will build three structures totaling 68,500 square feet with associated weather-proofed ramps totaling 4,000 square feet. These structures will replace the aging facilities in Zone 11 with new facilities that meet current codes and standards and better support program requirements:

- HE Laboratory: Equipment and facility will be designed to sustain an HE loading of 12 lb (±15%) HE equivalent. (28,000 square feet)
- HE Staging: Equipment and facility will be designed to sustain 50 lb (±15%) HE equivalent for temporary storage. (500 square feet)
- Technology Development and Deployment Laboratory: Provide necessary laboratory space for approximately 73 personnel to support the weapons complex mission. (40,000 square feet)

The CD-3A site preparation and long lead procurement scope included security fencing and utility relocations, and long lead procurement of blast chambers.

Justification

Currently HE S&E personnel, as well as laboratory operations, are in 15 separate facilities which are, on average, more than 60 years old. The existing facilities are not constructed for today's operations or HE limits, and their distribution across Zone 11 does not provide for efficient work processes. The distance between facilities increases travel time for personnel and materials back and forth, which adds additional cost to operations. In addition, safety, security, and environmental issues associated with these aging facilities are mounting, as are the costs of addressing them.

[a] This TPC has been informed by an ongoing comprehensive estimate at completion, but it has not been formally reviewed by NNSA.
[b] All square foot values have been rounded to the nearest 500 SF.

Current HE capacity limits that prohibit quantities greater than a small amount create inefficient operations in several of the laboratories. HE limits mandate additional moves of HE to various facilities as well as to maintain safe separation limits. The HE capacity limitations are primarily due to the original design and structure of the old facilities. The numerous HE handling activities required to load, unload and move the HE increase potential safety hazards.

This project provides the following additional benefits in support of HE Manufacturing:

- Computational and experimental capability
- Capability to develop diagnostic tools for the evaluation, manufacturing support, surveillance, and testing of materials
- Capability to conduct technology development in modern facilities (most existing facilities that provide these capabilities are over 60 years old)
- Separate classified and non-classified spaces, increasing efficiency and lowering Information Security risk

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. Funds appropriated under this data sheet may be used to provide independent assessments for planning and execution of this project, and contracted support services to the federal project team for oversight and support.

Key Performance Parameters (KPPs)
The Threshold KPPs, represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion.

Performance Measure[a]
HE Laboratory: HE Operational Limit of 12 pounds
HE Staging: HE Operational Limit of 50 pounds
Technology Development and Deployment Laboratory: Accommodate approximately 73 personnel in the laboratory space; minimum number of 64, but no more than 85

[a] There are no objective KPPs for the HESE project.

3. Project Cost and Schedule

Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2015	11,800	11,760	61
FY 2016	0	-11	1,515
FY 2017	-28 [a]	0	5,106
FY 2018	500 [b]	519	4,041
FY 2019	0	-1,084 [c]	-7 [d]
FY 2020	3,100	4,188	4,282
FY 2021	3,125	3,125	1,585
FY 2022	0	0	1,914
Total Design	**18,497**	**18,497**	**18,497**
Construction			
FY 2020	76,900	76,900	0
FY 2021	39,875	39,875	10,200
FY 2022	0	0	20,431
FY 2023	20,000	20,000	96,300
FY 2024	101,356	101,356	91,950
FY 2025	0	0	19,250
Total Construction	**238,131**	**238,131**	**238,131**
TEC			
FY 2015	11,800	11,760	61
FY 2016	0	-11	1,515
FY 2017	-28	0	5,106
FY 2018	500	519	4,041
FY 2019	0	-1,084	-7
FY 2020	80,000	81,088	4,282
FY 2021	43,000	43,000	11,785
FY 2022	0	0	22,345
FY 2023	20,000	20,000	96,300
FY 2024	101,356	101,356	91,950
FY 2025	0	0	19,250
Total TEC	**256,628**	**256,628**	**256,628**

[a] Reflects recission of $28,013 in FY 2017.

[b] Reflects an internal reprogramming from 12-D-301, Transuranic Waste Facilities, LANL project to this project for continued design activities conducted by the U.S. Army Corps of Engineers

[c] Reflects result of deobligations that occurred during FY 2019 on AY 2015 funding

[d] Reflects a credit that occurred during FY 2019 execution

$K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2013	1,790	1,790	200
FY 2014	750	750	1,200
FY 2015	100	100	400
FY 2016	100	100	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	130	130	0
FY 2021	3,750	3,750	0
FY 2022	0	0	0
FY 2023	0	0	250
FY 2024	4,000	4,000	3,800
FY 2025	1,965	1,965	3,200
FY 2026	0	0	3,000
FY 2027			535
Total, OPC	**12,585**	**12,585**	**12,585**
Total Project Costs (TPC)			
FY 2013	1,790	1,790	200
FY 2014	750	750	1,200
FY 2015	11,900	11,860	461
FY 2016	100	89	1,515
FY 2017	-28	0	5,106
FY 2018	500	519	4,041
FY 2019	0	-1,084	-7
FY 2020	80,130	81,218	4,282
FY 2021	46,750	46,750	11,785
FY 2022	0	0	22,345
FY 2023	20,000	20,000	96,550
FY 2024	105,356	105,356	95,750
FY 2025	1,965	1,965	22,450
FY 2026	0	0	3,000
FY 2027	0	0	535
Total TPC	**269,213**	**269,213**	**269,213**

4. Details of Project Cost Estimate

($K)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	17,997	17,997	17,847
Federal Support	500	500	500
Contingency	0	0	150
Total Design	**18,497**	**18,497**	**18,497**
Construction			
Site Work	25,500	14,541	14,541
Equipment	6,500	4,450	4,450
Construction	160,331	147,930	147,930
Federal Support	6,000	3,410	3,410
Contingency	39,800	24,800	24,800
Total Construction	**238,131**	**195,131**	**195,131**
Total Estimated Cost (TEC)	**256,628**	**213,628**	**213,628**
Contingency, TEC	*39,800*	*24,800*	*24,950*
Other Project Costs (OPC)			
OPC except D&D			
Analysis of Alternatives	200	200	200
Conceptual Design	1,600	1,600	1,600
Startup (Transition to Operations)	7,750	9,482	9,482
Equipment and Moves	1,390	1,590	1,590
Federal Support	1,000		
Contingency	645	1,500	1,500
Total, OPC except D&D	12,585	14,372	14,372
Total, OPC D&D	0	0	0
Total OPC	**12,585**	**14,372**	**14,372**
Contingency, OPC	*645*	*1,500*	*1,500*
Total Project Cost	**269,213**	**228,000**	**228,000**
Total Contingency (TEC+OPC)	***40,445***	***26,300***	***26,450***

5. Schedule of Appropriations Requests

($K)							
Request Year	**Type**	**Prior Years**	**FY2022**	**FY2023**	**FY 2024**	**FY 2025**	**Total**
FY 2015	TEC	72,300	0	0	0	0	72,300
	OPC	24,700	0	0	0	0	24,700
	TPC	97,000	0	0	0	0	97,000
FY 2016	TEC	96,456	0	0	0	0	96,456
	OPC	36,945	0	0	20,234	0	57,179
	TPC	133,401	0	0	20,234	0	153,635
FY 2020	TEC	135,272	0	0	0	0	135,272
	OPC	6,620	3,750	19,655	30,200	0	60,225
	TPC	141,892	3,750	19,655	30,200	0	195,497
FY 2021	TEC	135,272	0	0	0	0	135,272
	OPC	6,620	3,000	20,405	30,200	0	60,225
	TPC	141,892	3,000	20,405	30,200	0	195,497
FY 2023	TEC	135,272	0	20,000	58,356	0	213,628
	OPC	6,620	0	0	5,787	1,965	14,372
	TPC	141,892	0	20,000	64,143	1,965	228,000
FY 2024	TEC	135,272	0	20,000	101,356	0	256,628
	OPC	6,620	0	0	4,000	1,965	12,585
	TPC	141,892	0	20,000	105,356	1,965	269,213

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	1Q FY 2028
Expected Useful Life (number of years)	50
Expected Future Start of D&D of this capital asset (fiscal quarter)	1Q FY 2078

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	15.14	15.14	757	757

7. D&D Information

The disposition of the existing facilities has been captured in NNSA's infrastructure planning system and will be funded outside of the line-item once HESE is operational.

	Square Feet
New area being constructed by this project at Pantex Plant	72,500
Area of D&D at the Pantex Plant	0[a]
Area at the Pantex Plant to be transferred, sold, and/or D&D outside the project including area previously "banked"	72,500
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously "banked"	0
Total area eliminated	72,500[a]

Pantex Plant Zone 11, Bldgs 11-2, 11-5, 11-14, 11-16, 11-17, 11-17A, 11-18, 11-19, 11-22, 11-27, 11-28, 11-38, 11-45, 11-47, 11-R-4, 11-R-7, 11-R-8, 11-R-10, 11-R-11, 11-R-13, 11-R-13A, and 11-R-23.

8. Acquisition Approach

The design and the construction were acquired through firm-fixed price subcontracts under the existing M&O cost plus incentive fee contract.

[a] Changed from the FY 2021 CPDS that indicated 82,766 SF because the D&D has been removed from the project.

Uranium Processing Facility (UPF), 06-D-141
Y-12 National Security Complex, Oak Ridge, Tennessee
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary:

The FY 2024 Request for the Uranium Processing Facility (UPF) is $760,000,000. The most recent Critical Decision (CD)-2/3 was approved on March 21, 2018, by the Deputy Secretary of Energy, with a total project cost (TPC) of $6,500,000,000 and a CD-4 of December 31, 2025. A Level 4 Federal Project Director has been assigned to this project and has approved this Construction Project Data Sheet (CPDS).

The project plans to allocate $112,000,000 in FY 2024 for the Salvage and Accountability Building (SAB) Subproject (06-D-141-09). The CD-2/3 for the subproject was approved on March 21, 2018, by the Deputy Secretary of Energy with a TPC of $1,180,000,000. The long lead equipment authorized as part of MPB CD-3B for the SAB was included in the SAB TPC at CD-2/3.

The project plans to allocate $630,000,000 in FY 2024 for the Main Process Building (MPB) Subproject (06-D-141-04). The CD-2/3 was approved on March 21, 2018, by the Deputy Secretary of Energy with a TPC of $4,731,800,000. The CD-3A for Long Lead Procurement and Site Preparation was approved on March 30, 2016. The long lead equipment authorized as part of CD-3B for the MPB is included in the MPB TPC.

The project plans to allocate $18,000,000 in FY 2024 to the Process Support Facilities (PSF) Subproject (06-D-141-08). The CD-2/3 was approved on March 16, 2018 by the Project Management Executive with a TPC of $140,000,000. The Program Secretarial Officer approved a baseline change proposal in February 2023, increasing the TPC to $194,000,000, and extending the CD-4 date to December 2026. The cost increase and schedule extension are due to contractor performance below baseline expectations, COVID cost impacts, and procurement cost increases.

Significant Changes:

Construction associated with the UPF project is ongoing, and the project is performing startup and commissioning activities for completed scope as appropriate. Significant construction activities completed in FY 2022 include completing the Mechanical Electrical Building (MEB) construction ahead of schedule, installing the Process Gas Yard tanks and equipment, completing primary utility connections from the Process Support Facility (PSF) to the Y-12 Plant; positioning gloveboxes for Main Casting, Oxide Materials Production, Special Materials Production, Beaker Leaching, and Low Equity Calcination in the buildings; and positioning the first Electric Recovery Furnace and the Waste Preparation Walk-in-Enclosure in the MPB and SAB respectively.

This data sheet serves as the report required per 50 USC §2744, since the total estimated cost for the project exceeds by more than 25% the amount shown in the FY 2023 budget justification. Project cost changes are detailed under this section.

In March 2018, UPF achieved Critical Decision (CD)-2/3, *Approve Performance Baseline/Approve Start of Construction*, with a total project cost (TPC) of $6.5 billion and a completion date of 4th Quarter, FY 2025. Based on information under review by the Department, the UPF project will exceed both the CD-2/3 schedule and TPC. The current federal assessment estimates the cost range for the UPF project as $8.50 to $8.95 billion and with a project completion range of first quarter FY 2029 to second quarter FY 2029. The FY 2024 FYNSP funding profile is funded at $8.57 billion, representing NNSA's current best estimate until the projected is re-baselined. These estimates are preliminary and will likely change through the External Independent Review and Independent Cost Review currently underway, and in advance of submitting a baseline change request to the Deputy Secretary for approval. Once the rebaseline is approved by the Deputy Secretary, the funding profile will be aligned with the new baseline.

The CPDS also reflects a reprogramming of $203.1 million for FY 2023 that is being coordinated within the Administration, in advance of the Deputy Secretary approval of a revised baseline. The reprogramming is needed to maintain the pace of the project to complete at the earliest possible time for the lowest possible cost. The forecasted cost increases and schedule delays are primarily driven by construction inefficiencies (from COVID, supply chain, and performance), increased subcontract and equipment delivery costs, and longer durations for start-up & turnover activities.

The UPF Project experienced direct cost impacts due to COVID, including reimbursement of the costs of paid leave associated with COVID-19 (including sick leave) for the contractor and eligible subcontractors. Additional impacts include direct costs associated with temperature checks, planning and response activities related to COVID-19, construction labor for facility cleaning, bus cleaning, and hand sanitizing stations, additional busing and additional medical support. Total direct, impacts realized through September 2022 are $34,100,000. The National Nuclear Security Administration (NNSA) recognizes that there are other indirect cost and schedule COVID impacts to include reduced productivity of craft and non-manual workers, and cost and schedule impacts to subcontracts and procurements. The value of COVID impacts is included in the revised forecast TPC.

FY 2024 and prior year funds will be used for ongoing construction, startup, and commissioning activities for the MPB, SAB, and PSF UPF subprojects. Subproject descriptions are included in Section 2.

As represented since the FY 2012 Request, design, construction, and Other Project Costs (OPC) will continue to be executed through the line-item funding. After October 1, 2011, OPC work has been and will only be performed using funding specifically appropriated by Congress for the project.

Critical Milestone History

Table 1: Uranium Processing Facility Project (06-D-141) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2011	12/17/2004	N/A	7/25/2007	TBD	2Q FY 2014	TBD	TBD	TBD
FY 2012	12/17/2004	N/A	7/25/2007	4Q FY 2013	2Q FY 2014	4Q FY 2013	TBD	TBD
FY 2013	12/17/2004	N/A	7/25/2007	4Q FY 2013	2Q FY 2014	4Q FY 2013	N/A	TBD
FY 2014	12/17/2004	N/A	6/8/2012	3Q FY 2014	4QFY 2015	3Q FY 2015	N/A	TBD
FY 2015	12/17/2004	N/A	6/8/2012	TBD	TBD	TBD	N/A	TBD
FY 2016	12/17/2004	2/9/2006	6/8/2012	TBD	TBD	TBD	N/A	TBD
FY 2017	12/17/2004	6/24/2015	6/8/2012	4Q FY 2017	4Q FY 2017	4Q FY 2017	N/A	4Q FY 2025
FY 2018	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	4Q FY 2017	2Q FY 2018	N/A	4Q FY 2025
FY 2019	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	8/25/2017	2Q FY 2018	N/A	4Q FY 2025
FY 2020 PB	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2021	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2022	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2023	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2024	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	1Q-2Q FY 2029

Table 1.1: Site Readiness Subproject (06-D-141-01) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2014 PB	12/17/2004	N/A	6/8/2012	1/29/2013	1/29/2013	1/29/2013	N/A	2Q FY 2015
FY 2015	12/17/2004	N/A	6/8/2012	1/29/2013	1/29/2013	1/29/2013	N/A	2Q FY 2015
FY 2016	12/17/2004	2/9/2006	6/8/2012	1/29/2013	1/29/2013	1/29/2013	N/A	2Q FY 2015
FY 2017	12/17/2004	2/9/2006	6/8/2012	1/29/2013	1/29/2013	1/29/2013	N/A	2/27/2015

Table 1.2: Site Infrastructure and Services Subproject (06-D-141-05) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2015	12/17/2004	N/A	7/25/2007	4Q FY 2014	4Q FY 2013	4Q FY 2014	N/A	4Q FY 2016
FY 2016	12/17/2004	2/9/2006	6/8/2012	2Q FY 2015	3Q FY 2015	2Q FY 2015	N/A	4Q FY 2016
FY 2017 PB	12/17/2004	2/9/2006	6/8/2012	3/12/2015	3/12/2015	3/12/2015	N/A	4/28/2018
FY 2018	12/17/2004	2/9/2006	6/8/2012	3/12/2015	3/12/2015	3/12/2015	N/A	4/28/2018
FY 2019	12/17/2004	2/9/2006	6/8/2012	3/12/2015	3/12/2015	3/12/2015	N/A	4/28/2018
FY 2020	12/17/2004	2/9/2006	6/8/2012	3/12/2015	3/12/2015	3/12/2015	N/A	2/28/2018

Table 1.3: Substation Subproject (06-D-141-07) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	12/17/2004	6/24/2015	6/8/2012	4Q FY 2016	4Q FY 2016	4Q FY 2016	N/A	1Q FY 2019
FY 2018 PB	12/17/2004	6/24/2015	6/8/2012	9/14/2016	9/30/2017	9/14/2016	N/A	6/30/2020
FY 2019	12/17/2004	6/24/2015	6/8/2012	9/14/2016	12/22/2017	9/14/2016	N/A	6/30/2020
FY 2020	12/17/2004	6/24/2015	6/8/2012	9/14/2016	12/22/2017	9/14/2016	N/A	6/30/2020
FY 2021	12/17/2004	6/24/2015	6/8/2012	9/14/2016	12/22/2017	9/14/2016	N/A	12/20/2019

Table 1.4: Mechanical Electrical Building Subproject (06-D-141-06) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	12/17/2004	6/24/2015	6/8/2012	2Q FY 2017	4Q FY 2017	2Q FY 2017	N/A	4Q FY 2021
FY 2018 PB	12/17/2004	6/24/2015	6/8/2012	12/13/2016	4Q FY 2017	12/13/2016	N/A	1/31/2022
FY 2019	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	1/31/2022
FY 2020	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	1/31/2022
FY 2021	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	1/31/2022
FY 2022	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	1/31/2022
FY 2023	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	8/31/2022[a]
FY 2024	12/17/2004	6/24/2015	6/8/2012	12/13/2016	9/30/2017	12/13/2016	N/A	7/8/2022

[a] Reflects BCP approved in FY 2022 extending the CD-4 date.

Table 1.5: Process Support Facilities Subproject (06-D-141-08) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	12/17/2004	6/24/2015	6/8/2012	3Q FY 2017	3Q FY 2017	3Q FY 2017	N/A	4Q FY 2021
FY 2018	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	4Q FY 2017	2Q FY 2018	N/A	4Q FY 2025
FY 2019	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	9/30/2017	2Q FY 2018	N/A	4Q FY 2025
FY 2020 PB	12/17/2004	6/24/2015	6/8/2012	3/16/2018	9/30/2017	3/16/2018	N/A	12/31/2025
FY 2021	12/17/2004	6/24/2015	6/8/2012	3/16/2018	9/30/2017	3/16/2018	N/A	12/31/2025
FY 2022	12/17/2004	6/24/2015	6/8/2012	3/16/2018	9/30/2017	3/16/2018	N/A	12/31/2025
FY 2023	12/17/2004	6/24/2015	6/8/2012	3/16/2018 [a]	9/30/2017	3/16/2018	N/A	12/31/2025
FY 2024	12/17/2004	6/24/2015	6/8/2012	3/16/2018	9/30/2017	3/16/2018	N/A	12/31/2026 [b]

Table 1.6: Salvage and Accountability Building Subproject (06-D-141-09) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	12/17/2004	6/24/2015	6/8/2012	4Q FY 2017	4Q FY 2017	4Q FY 2017	N/A	4Q FY 2025
FY 2018	12/17/2004	6/24/2015	6/8/2012	3/21/2018	4Q FY 2017	3/21/2018	N/A	4Q FY 2025
FY 2019	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	4Q FY 2025
FY 2020 PB	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2021	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2022	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2023	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2024	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	1Q-2Q FY 2029[c]

Table 1.7: Main Process Building Subproject (06-D-141-04) Critical Milestone History by Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2014	12/17/2004	N/A	6/8/2012	3Q FY 2014	4Q FY 2015	3Q FY 2015	N/A	TBD
FY 2015	12/17/2004	N/A	6/8/2012	TBD	TBD	TBD	N/A	TBD
FY 2016	12/17/2004	2/9/2006	6/8/2012	TBD	TBD	TBD	N/A	TBD
FY 2017	12/17/2004	6/24/2015	6/8/2012	4Q FY 2017	4Q FY 2017	4Q FY 2017	N/A	4Q FY 2025
FY 2018	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	4Q FY 2017	2Q FY 2018	N/A	4Q FY 2025
FY 2019	12/17/2004	6/24/2015	6/8/2012	2Q FY 2018	8/25/2017	2Q FY 2018	N/A	4Q FY 2025
FY 2020 PB	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2021	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2022	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2023	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	12/31/2025
FY 2024	12/17/2004	6/24/2015	6/8/2012	3/21/2018	8/25/2017	3/21/2018	N/A	1Q-2Q FY 2029[c]

[a] Corrects CD-2/3 approval date to 3/16/2018 from FY 2020 through FY 2022 dates, which were in error.
[b] Reflects BCP approved in FY 2023 extending the CD-4 date.
[c] Reflects the current federal assessment estimates with a project completion range of first quarter FY 2029 to second quarter FY 2029.

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3 – Approve Start of Construction
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Table 2: Uranium Processing Facility Project (06-D-141) Baseline and Long Lead Approval by Fiscal Quarter or Date

Fiscal Year	UPF CD-2/3	MPB CD-3A	MPB CD-3B	MPB CD-3C	Substation CD-3A
FY 2017	N/A	2Q FY 2016	1Q F Y2017	1Q FY 2017	3Q FY 2016
FY 2018	3/21/2018	3/30/2016	1/13/2017	N/A	N/A

MPB CD-3A – Long Lead Procurement for site preparation and long lead procurements
MPB CD-3B – Long Lead Procurements
MPB CD-3C – Cancelled as reflected in the FY 2018 CPDS
Substation CD-3A – Cancelled as reflected in the FY 2018 CPDS

Project Cost History

Table 3: Uranium Processing Facility Project (06-D-141) Financial Data ($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2011	351,149	935,000-1,604,000	1,124,000-1,928,000	276,000-472,000	TBD	TBD	1,400,000-3,500,000
FY 2012	528,690	3,174,779-5,320,310	3,703,000-5,849,000	497,000-651,000	N/A	497,000-651,000	4,200,000-6,500,000
FY 2013	566,192	3,136,808-5,150,808	3,703,000-5,717,000	497,000-783,000	N/A	497,000-783,000	4,200,000-6,500,000
FY 2014	1,164,000	TBD	TBD	TBD	N/A	TBD	TBD
FY 2015	TBD	TBD	TBD	TBD	N/A	TBD	TBD
FY 2016	TBD	TBD	TBD	TBD	N/A	TBD	TBD
FY 2017	1,880,000	4,103,000	5,983,000	517,000	0	517,000	6,500,000
FY 2018	1,926,000	4,148,500	6,074,500	425,500	0	425,500	6,500,000
FY 2019	1,855,809	4,463,724	6,319,533	180,467	0	180,467	6,500,000
FY 2020	1,838,000	4,283,337	6,121,337	378,663	0	378,663	6,500,000
FY 2021	1,838,000	4,283,337	6,121,337	378,663	0	378,663	6,500,000
FY 2022	1,838,000	4,283,337	6,121,337	378,663	0	378,663	6,500,000
FY 2023	1,838,000	4,283,337	6,121,337	378,663	0	378,663	6,500,000
FY 2024	1,838,000	6,356,467	8,194,467	378,663	0	378,663	8,500,00-8,950,000[a]

[a] The current federal assessment estimates the cost range for the UPF project as $8.50 to $8.95 billion. The FY 2024 FYNSP funding profile is funded at $8.57 billion, which includes a proposed reprogramming of $203.1 million in FY 2023, representing NNSA's current best estimate until the projected is re-baselined.

Table 3.1: Site Readiness Subproject (06-D-141-01) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2015	N/A	64,000	64,000	1,000	N/A	1,000	65,000
FY 2016		64,000	64,000	1,000	N/A	1,000	65,000
FY 2017	0	43,277	43,277	0	0	0	43,277
FY 2018	0	43,277	43,277	0	0	0	43,277
FY 2019	0	43,714	43,714	0	0	0	43,714

Table 3.2: Site Infrastructure and Services Subproject (06-D-141-05) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2015	N/A	58,000	58,000	1,500	N/A	1,500	59,500
FY 2016	N/A	84,500	84,500	500	N/A	500	85,000
FY 2017	0	78,000	78,000	500	0	500	78,500
FY 2018	0	78,000	78,000	500	0	500	78,500
FY 2019	0	78,000	78,000	500	0	500	78,500
FY 2020	0	60,500	60,500	0	0	0	60,500

Table 3.3: Substation Subproject (06-D-141-07) Financial Data
($K) [a]

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	0	48,000	48,000	2,000	0	2,000	50,000
FY 2018	0	60,000	60,000	0	0	0	60,000
FY 2019	0	60,000	60,000	0	0	0	60,000
FY 2020	0	60,000	60,000	0	0	0	60,000
FY 2021	0	48,568	48,568	0	0	0	48,568
FY 2022	0	43,800	43,800	0	0	0	43,800

Table 3.4: Mechanical Electrical Building Subproject (06-D-141-06) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	0	540,000	540,000	60,000	0	60,000	600,000
FY 2018	0	284,000	284,000	0	0	0	284,000
FY 2019	0	283,917	283,917	83	0	83	284,000
FY 2020	0	282,980	282,980	1,020	0	1,020	284,000
FY 2021	0	282,980	282,980	1,020	0	1,020	284,000
FY 2022	0	282,980	282,980	1,020	0	1,020	284,000
FY 2023	0	308,980	308,980	1,020	0	1,020	310,000

[a] Includes $16.2 million of savings from the Substation Subproject which has been redeployed to cover a TPC increase in the MEB Subproject.

Table 3.5: Process Support Facilities Subproject (06-D-141-08) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	0	55,000	55,000	5,000	0	5,000	60,000
FY 2018	0	111,000	111,000	10,000	0	10,000	121,000
FY 2019	0	116,702	116,702	4,298	0	4,298	121,000
FY 2020	0	118,000	118,000	22,000	0	22,000	140,000
FY 2021	0	118,000	118,000	22,000	0	22,000	140,000
FY 2022	0	118,000	118,000	22,000	0	22,000	140,000
FY 2023	0	118,000	118,000	22,000	0	22,000	140,000
FY 2024	0	172,000	172,000	22,000	0	22,000	194,000

Table 3.6: Salvage and Accountability Building Subproject (06-D-141-09) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	0	1,200,000	1,200,000	130,000	0	130,000	1,330,000
FY 2018	0	1,060,250	1,060,250	25,000	0	25,000	1,085,250
FY 2019	0	1,013,761	1,013,761	16,239	0	16,239	1,030,000
FY 2020	0	1,105,000	1,105,000	75,000	0	75,000	1,180,000
FY 2021	0	1,105,000	1,105,000	75,000	0	75,000	1,180,000
FY 2022	0	1,105,000	1,105,000	75,000	0	75,000	1,180,000
FY 2023	0	1,105,000	1,105,000	75,000	0	75,000	1,180,000
FY 2024	0	1,595,403	1,595,403	75,000	0	75,000	1,670,403[a]

Table 3.7: Main Process Building Subproject (06-D-141-04) Financial Data
($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2015	TBD	TBD	TBD	TBD	N/A	TBD	TBD
FY 2016	TBD	TBD	TBD	TBD	N/A	TBD	TBD
FY 2017	1,880,000	2,138,723	4,018,723	319,500	0	319,500	4,338,223
FY 2018	1,926,000	2,511,973	4,437,973	390,000	0	390,000	4,827,973
FY 2019	1,855,809	2,867,630	4,723,439	159,347	0	159,347	4,882,786
FY 2020	1,838,000	2,613,143	4,451,143	280,643	0	280,643	4,731,786
FY 2021	1,838,000	2,613,143	4,451,143	280,643	0	280,643	4,731,786
FY 2022	1,838,000	2,613,143	4,451,143	280,643	0	280,643	4,731,786
FY 2023	1,838,000	2,603,343	4,441,343	280,643	0	280,643	4,721,986 [b]
FY 2024	1,838,000	4,132,070	5,970,070	280,643	0	280,643	6,250,713[c]

[a] The current federal assessment estimates represent NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

[b] Reflects a reduction in the MPB Construction cost as recovery of unearned fee to cover an increase in the MEB Subproject.

[c] The current federal assessment estimates represent NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

2. Project Scope and Justification

Scope

The UPF Project is a design and construction project. The UPF Project consists of a series of industrial and nuclear buildings and supporting infrastructure. It is a major system acquisition that was selected in the Record of Decision for the Complex Transformation Supplemental Programmatic Environmental Impact Statement to ensure the long-term viability, safety, and security of the Enriched Uranium (EU) capability at the Y-12 National Security Complex. The UPF consists of 6 buildings, totaling 568,524 square feet. The UPF project focuses on modernizing uranium processing capabilities at Y-12 to reduce program and safety risk. The UPF project provides new buildings to replace the Building 9212 capabilities for Highly Enriched Uranium (HEU) casting, oxide production, recovery, decontamination, and assay. Coordination between Headquarters Office of Infrastructure, the Uranium Program Manager, the NNSA Production Office (NPO), and the Y-12 Acquisition and Project Management Office (APMO) is essential as the uranium mission strategy and associated implementation plans define how the uranium capabilities are transitioned, relocated, sustained, and/or replaced.

The goals and objectives of the UPF Project are to support the following modernization strategy:

- Ensure the long-term capability and improve the reliability of EU operations;
- Replace deteriorating, end-of-life buildings with modern manufacturing buildings;
- Significantly improve the health and safety posture for workers and the public by replacing administrative controls with engineered controls to manage the risks related to worker safety, criticality safety, fire protection, and environmental compliance.

The UPF project consists of the following subprojects:

Site Readiness Subproject (06-D-141-01): The Site Readiness Subproject scope included Bear Creek Road relocation, including a bridge overpass of the haul road; installation of potable water lines paralleling the new road; electrical line demolition to make way for the road and clear the construction site; electrical line and communication cable installation; preparation of the West Borrow area to receive excess-soil and preparation and maintenance of a spoil area for wet soil; extension of an existing haul road for access to the construction site; and jack-and-bore installation of casings for future utilities. No change since the previous Request.

Site Infrastructure and Services (SIS) Subproject (06-D-141-05): The SIS Subproject scope included demolition of Building 9107 and its hillside, installation of haul road security features, completion of a sedimentation basin, a concrete batch plant, and completion of the Construction Support Building, which is 66,000 square feet. No change since the previous Request.

Substation Subproject (06-D-141-07): The Substation Subproject provided for the installation of the 161 kilovolt (kV) Main Electrical Substation for the UPF Project and capacity for most of the rest of the Y-12 plant. The Substation provides electrical power from the Tennessee Valley Authority (TVA) 161kV transmission system. The Substation Subproject includes all equipment, facilities, and structures needed for a fully operational substation. No change since the previous Request.

Mechanical Electrical Building (MEB) Subproject (06-D-141-06): The MEB Subproject constructed a 66,384 square feet facility and installed the utility equipment and support systems required by both the MPB and the SAB. The MEB is a stand-alone building housing mechanical, electrical, heating, ventilation, air conditioning, utility equipment, and support systems. The MEB is constructed to nonnuclear commercial industrial standards. This subproject includes a leased warehouse and fabrication facility; a cooling tower; and an onsite warehouse. The MEB Subproject completed in July 2022.

Process Support Facilities (PSF) Subproject (06-D-141-08): The Process Support Facilities Subproject will construct a 23,914 square foot building and provide facilities for instrument air, demineralized water, waste management, and chemical and gas storage needed to support the MPB and SAB. No change since the previous Request.

Salvage and Accountability Building (SAB) Subproject (06-D-141-09): The SAB Subproject consists of two buildings totaling 160,113 square feet that will contain the following processes: waste preparation, decontamination, nondestructive analysis, the clean and contaminated shops, chemical recovery, calcination and leaching, electronics and calibration maintenance, filter room, and personnel-related rooms. The SAB will be constructed to standards commensurate with the radioactive hazard and security requirements for the materials and processes contained within. This subproject includes support buildings including a fire tank pump building as well as the Personnel Support Building which provides personnel access and monitoring station, truck bay, loading dock, and material access. Long lead equipment purchases associated with the SAB Subproject are allocated to the SAB TPC. No change since the previous Request.

Long Lead Procurements, CD-3B: Included long lead gloveboxes, skids, and select long lead procurements for structural steel, rebar, embeds, and specialty items associated with SAB.

Main Process Building (MPB) Subproject (06-D-141-04): The MPB Subproject consists of a nuclear building totaling 252,113 square feet that will house the casting and oxide production capabilities. It also contains nondestructive analysis and waste preparations, furnaces and repacking, and spaces needed for process support such as the shift manager's office, restrooms, and other personnel-related rooms. The MPB will be constructed to nuclear standards commensurate with high-hazard materials and security for the processes to be carried out within. The MPB Subproject will include the construction of the Highly Enriched Uranium Materials Facility (HEUMF) connector, and the new Perimeter Intrusion Detection and Assessment System surrounding the UPF campus and support buildings. Design costs for the UPF project are included in the MPB Subproject baseline, as design costs are not tracked for each individual UPF subproject. No change since the previous Request.

Site Preparation and Long Lead Procurements, CD-3A: Included excavation and fill for the MPB, SAB, and the MEB; installation of temporary facilities, power, storm water and sanitary sewers; and long lead procurements of tower cranes and rebar for the MEB slab.

Long Lead Procurements, CD-3B: Included long lead gloveboxes, skids, and select long lead procurements for structural steel, rebar, embeds, and specialty items associated with MPB.

<u>Justification and Mission Need</u>

The UPF Project is needed to ensure the long-term viability, safety, and security of the Enriched Uranium (EU) capability in the United States. The UPF Project will support the Nation's nuclear weapons stockpile, down blending of EU in support of nonproliferation, and provide uranium as feedstock for fuel for naval reactors. Currently, these capabilities reside in aged Manhattan Project-era facilities. There is substantial risk that the existing facilities will continue to deteriorate to the point of significant impact to Defense Programs, Defense Nuclear Nonproliferation, and Naval Reactors programs. The impacts could result in loss of the U.S. capability to maintain the nuclear weapons stockpile through life extension programs, shutdown of the U.S. Navy nuclear powered fleet due to lack of EU fuel feedstock materials, and impact to the Defense Nuclear Nonproliferation program's ability to reduce the enrichment level of foreign research reactors through supply of lower enrichment fuels manufactured at Y-12. The risk of inadvertent or accidental shutdown of the existing facilities is high and may occur prior to completion and startup of the UPF Project.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets. Consistent with DOE O 413.3B, Earned Value (EV) information for all subprojects and the UPF design effort is reported in the Project Assessment and Reporting System (PARS). The Management and Operating (M&O) contractor received EV Management System certification approval from DOE in 2018. Funds appropriated under this data sheet may be used for the incremental funding and execution of the project on an annual basis. Funds appropriated under this data sheet may be used for contracted support services to the Federal Project Director and to conduct reviews of design and construction.

The UPF project contingency was originally calculated using a detailed risk assessment in advance of CD-2/3. The contingency was updated at the completion of contract negotiations and reflects additional contingency due to the favorable outcome of the negotiations (i.e., the contract value was lower than planned, resulting in additional contingency).

The UPF Mission Need Statement approved in December 2004, states that safe, efficient, and secure enriched uranium processing capabilities are needed within the Nuclear Weapons Complex to meet the mission of the DOE's NNSA. The UPF Project is needed to ensure the long-term viability, safety, and security of the EU capability in the United States. The UPF Mission Need was reexamined at each of the subsequent CD phases and remains valid.

Key Performance Parameters (KPPs)

The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The Objective KPPs represent the desired project performance.

Table 4: Key Performance Parameters

Performance Measure	Threshold	Objective
UPF supports phasing out mission dependency on 9212	Threshold Performance Parameters are identified in the Classified Project Requirements Document	Objective Performance Parameters are identified in the Classified Project Requirements Document

3. Financial Schedule

UPF funding is appropriated at the Overall Project level (06-D-141) and is allocated to the subprojects in the tables below.

Table 5: Uranium Processing Facility Project (06-D-141)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2006	5,000	5,000	0
FY 2007	5,000	5,000	677
FY 2008	38,583	38,583	33,950
FY 2009	90,622	90,622	79,184
FY 2010	94,000	94,000	80,959
FY 2011	115,271	115,271	109,855
FY 2012	160,194	160,109	170,700
FY 2013	269,069	269,026	192,389
FY 2014	301,886	301,886	198,448
FY 2015	270,929	269,823	220,761
FY 2016	298,000	297,978	309,154
FY 2017	179,884	179,748	326,205
FY 2018	9,562	10,954	115,718
Total Design	**1,838,000**	**1,838,000**	**1,838,000**
Construction			
FY 2013	43,714	43,714	5,242
FY 2014	0	0	25,928
FY 2015	60,500	60,500	20,853
FY 2016 [a]	132,000	132,000	32,270
FY 2017	395,116	395,116	89,918
FY 2018	653,438	653,438	298,467
FY 2019	701,980	701,853	568,246
FY 2020	740,000	739,973	826,841
FY 2021	718,500	718,500	890,993
FY 2022 [b]	586,500	586,500	798,037
FY 2023 [b]	548,106	548,106	890,597
FY 2024	710,000	710,154	722,511
FY 2025	485,000	485,000	541,665
FY 2026	350,000	350,000	316,276
FY 2027	174,000	174,000	217,100
FY 2028	57,613	57,613	111,523
Total Construction	**6,356,467**	**6,356,467**	**6,356,467**

[a] Allocation of funding and obligations reflects the final TPC of the Substation Subproject redeployed to cover a TPC increase in the MEB Subproject.

[b] FY 2022 and FY 2023 TEC and OPC values have been adjusted to reflect increases in near term procurement and construction activities, and delays in OPC activities. FY 2023 TEC also includes a proposed reprogramming of $203.1 million in FY 2023.

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs
TEC			
FY 2006	5,000	5,000	0
FY 2007	5,000	5,000	677
FY 2008	38,583	38,583	33,950
FY 2009	90,622	90,622	79,184
FY 2010	94,000	94,000	80,959
FY 2011	115,271	115,271	109,855
FY 2012	160,194	160,109	170,700
FY 2013	312,783	312,740	197,631
FY 2014	301,886	301,886	224,376
FY 2015	331,429	330,323	241,614
FY 2016 [a]	430,000	429,978	341,424
FY 2017	575,000	574,864	416,123
FY 2018	663,000	664,392	414,185
FY 2019	701,980	701,853	568,246
FY 2020	740,000	739,973	826,841
FY 2021	718,500	718,500	890,993
FY 2022	586,500	586,500	798,037
FY 2023	548,106	548,106	890,597
FY 2024	710,000	710,154	722,511
FY 2025	485,000	485,000	541,665
FY 2026	350,000	350,000	316,276
FY 2027	174,000	174,000	217,100
FY 2028	57,613	57,613	111,523
Total TEC	**8,194,467**	**8,194,467**	**8,194,467**
Other Project Costs (OPC)			
FY 2005	12,113	12,113	12,113
FY 2006	7,809	7,809	7,809
FY 2007	10,082	10,082	10,082
FY 2008	11,730	11,730	11,730
FY 2009	14,000	14,000	14,000
FY 2010	20,500	20,500	20,500
FY 2011 [b]	18,409	18,409	18,409
FY 2012	0	0	0

[a] Allocation of funding and obligations reflects the final TPC of the Substation Subproject redeployed to cover a TPC increase in the MEB Subproject.

[b] Updated to correctly represent the OPC funding allocated to the MPB subproject. This was an error in the prior year's CPDS and budget authority should have been aligned to the actual costs based on DCAA audit.

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	0	0	0
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	1,020	1,020	0
FY 2020	5,000	5,000	1,083
FY 2021	31,500	31,500	2,631
FY 2022 [a]	13,500	13,500	31,861
FY 2023 [a]	17,000	17,000	29,380
FY 2024	50,000	50,000	51,565
FY 2025	65,000	65,000	51,000
FY 2026	50,000	50,000	56,000
FY 2027	51,000	51,000	46,000
FY 2028	0	0	14,500
Total, OPC	**378,663**	**378,663**	**378,663**
Total Project Costs (TPC)			
FY 2005	12,113	12,113	12,113
FY 2006	12,809	12,809	7,809
FY 2007	15,082	15,082	10,759
FY 2008	50,313	50,313	45,680
FY 2009	104,622	104,622	93,184
FY 2010	114,500	114,500	101,459
FY 2011	133,680	133,680	128,264
FY 2012	160,194	160,109	170,700
FY 2013	312,783	312,740	197,631
FY 2014	301,886	301,886	224,376
FY 2015	331,429	330,323	241,614
FY 2016	430,000	429,978	341,424
FY 2017	575,000	574,864	416,123
FY 2018	663,000	664,392	414,185

[a] FY 2022 and FY 2023 TEC and OPC values have been adjusted to reflect increases in near term procurement and construction costs, and delays in OPC activities. FY 2023 TEC also includes a proposed reprogramming of $203.1 million in FY 2023.

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs
FY 2019	703,000	702,873	568,246
FY 2020	745,000	744,973	827,924
FY 2021	750,000	750,000	893,624
FY 2022	600,000	600,000	829,898
FY 2023	565,106	565,106	919,977
FY 2024	760,000	760,154	774,076
FY 2025	550,000	550,000	592,665
FY 2026	400,000	400,000	372,276
FY 2027	225,000	225,000	263,100
FY 2028	57,613	57,613	126,023
Total TPC [a]	**8,573,130**	**8,573,130**	**8,573,130**

[a] The current federal assessment estimates the cost range for the UPF project as $8.50 to $8.95 billion. The FY 2024 FYNSP funding profile is funded at $8.57 billion and includes a proposed reprogramming of $203.1 million in FY 2023 as a placeholder until the projected is re-baselined.

Table 5.1: Site Readiness Subproject (06-D-141-01) Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2013	43,714	43,714	5,242
FY 2014	0	0	25,928
FY 2015	0	0	12,107
FY 2016	0	0	437
FY 2017	0	0	0
Total Construction	**43,714**	**43,714**	**43,714**
TEC			
FY 2013	43,714	43,714	5,242
FY 2014	0	0	25,928
FY 2015	0	0	12,107
FY 2016	0	0	437
FY 2017	0	0	0
Total TEC	**43,714**	**43,714**	**43,714**
Other Project Costs (OPC)			
FY 2017	0	0	0
Total, OPC	**0**	**0**	**0**
Total Project Costs (TPC)			
FY 2013	43,714	43,714	5,242
FY 2014	0	0	25,928
FY 2015	0	0	12,107
FY 2016	0	0	437
FY 2017	0	0	0
Total TPC	**43,714**	**43,714**	**43,714**

Table 5.2: Site Infrastructure and Services Subproject (06-D-141-05)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2016	0	0	0
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2015 [a]	60,500	60,500	8,746
FY 2016	0	0	26,875
FY 2017	0	0	23,166
FY 2018	0	0	1,713
FY 2019	0	0	0
Total Construction	**60,500**	**60,500**	**60,500**
TEC			
FY 2015	60,500	60,500	8,746
FY 2016	0	0	26,875
FY 2017	0	0	23,166
FY 2018	0	0	1,713
FY 2019	0	0	0
Total TEC	**60,500**	**60,500**	**60,500**
Other Project Costs (OPC)			
FY 2016	0	0	0
FY 2017	0	0	0
Total, OPC	**0**	**0**	**0**
Total Project Costs (TPC)			
FY 2015	60,500	60,500	8,746
FY 2016	0	0	26,875
FY 2017	0	0	23,166
FY 2018	0	0	1,713
FY 2019	0	0	0
Total TPC	**60,500**	**60,500**	**60,500**

[a] Subproject received CD-4 approval in FY 2018 and completed under budget; baseline was $78,000,000, actual cost was $60,500,000.

Table 5.3: Substation Subproject (06-D-141-07)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2016	0	0	0
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2016 [a]	43,800	43,800	0
FY 2017	0	0	11,064
FY 2018	0	0	26,101
FY 2019	0	0	6,635
FY 2020	0	0	0
Total Construction	**43,800**	**43,800**	**43,800**
TEC			
FY 2016	43,800	43,800	0
FY 2017	0	0	11,064
FY 2018	0	0	26,101
FY 2019	0	0	6,635
FY 2020	0	0	0
Total TEC	**43,800**	**43,800**	**43,800**
Other Project Costs (OPC)			
FY 2016	0	0	0
FY 2017	0	0	0
Total, OPC	**0**	**0**	**0**
Total Project Costs (TPC)			
FY 2016	43,800	43,800	0
FY 2017	0	0	11,064
FY 2018	0	0	26,101
FY 2019	0	0	6,635
FY 2020	0	0	0
Total TPC	**43,800**	**43,800**	**43,800**

[a] The approximately $16,200,000 of cost savings from the Substation Subproject has been redeployed to the MEB subproject to cover a TPC increase.

Table 5.4: Mechanical Electrical Building Subproject (06-D-141-06)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2016	0	0	0
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2016	16,200	16,200	0
FY 2017	55,000	55,000	1,425
FY 2018	160,000	160,000	35,061
FY 2019	67,980	67,980	61,043
FY 2020	0	0	107,361
FY 2021	0	0	68,093
FY 2022	9,800	9,800	32,481
FY 2023 [a]	0	0	3,516
Total Construction	**308,980**	**308,980**	**308,980**
TEC			
FY 2016	16,200	16,200	0
FY 2017	55,000	55,000	1,425
FY 2018	160,000	160,000	35,061
FY 2019	67,980	67,980	61,043
FY 2020	0	0	107,361
FY 2021	0	0	68,093
FY 2022	9,800	9,800	32,481
FY 2023 [a]	0	0	3,516
Total TEC	**308,980**	**308,980**	**308,980**
Other Project Costs (OPC)			
FY 2019	1,020	1,020	0
FY 2020	0	0	28
FY 2021	0	0	880
FY 2022	0	0	112
FY 2023	0	0	0
Total, OPC	**1,020**	**1,020**	**1,020**
Total Project Costs (TPC)			
FY 2016	16,200	16,200	0
FY 2017	55,000	55,000	1,425
FY 2018	160,000	160,000	35,061
FY 2019	69,000	69,000	61,043
FY 2020	0	0	107,389
FY 2021	0	0	68,973
FY 2022	9,800	9,800	32,593
FY 2023	0	0	3,516
Total TPC	**310,000**	**310,000**	**310,000**

[a] FY 2023 MEB costs are for post CD-4 subcontract closeout costs and contingency.

Table 5.5: Process Support Facilities Subproject (06-D-141-08)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2016	0	0	0
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2018	15,000	15,000	2,139
FY 2019	30,000	30,000	6,853
FY 2020	54,000	54,000	18,539
FY 2021	19,000	19,000	36,535
FY 2022	0	0	47,214
FY 2023	36,000	36,000	41,720
FY 2024	18,000	18,000	19,000
Total Construction	**172,000**	**172,000**	**172,000**
TEC			
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	15,000	15,000	2,139
FY 2019	30,000	30,000	6,853
FY 2020	54,000	54,000	18,539
FY 2021	19,000	19,000	36,535
FY 2022	0	0	47,214
FY 2023	36,000	36,000	41,720
FY 2024	18,000	18,000	19,000
Total TEC	**172,000**	**172,000**	**172,000**
Other Project Costs (OPC)			
FY 2020	1,000	1,000	0
FY 2021	21,000	21,000	0
FY 2022	0	0	12,000
FY 2023	0	0	10,000
FY 2024	0	0	0
Total, OPC	**22,000**	**22,000**	**22,000**
Total Project Costs (TPC)			
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	15,000	15,000	2,139
FY 2019	30,000	30,000	6,853
FY 2020	55,000	55,000	18,539
FY 2021	40,000	40,000	36,535
FY 2022	0	0	59,214
FY 2023	36,000	36,000	51,720
FY 2024	18,000	18,000	19,000
Total TPC	**194,000**	**194,000**	**194,000**

Table 5.6: Salvage and Accountability Building Subproject (06-D-141-09)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2016	0	0	0
FY 2017	0	0	0
Total Design	**0**	**0**	**0**
Construction			
FY 2018	195,000	195,000	56,194
FY 2019	253,000	253,000	144,702
FY 2020	250,000	250,000	227,861
FY 2021	197,000	197,000	236,174
FY 2022	198,000	198,000	224,217
FY 2023	69,000	69,000	232,009
FY 2024	104,000	104,000	135,089
FY 2025	132,000	132,000	131,230
FY 2026	124,000	124,000	103,069
FY 2027	59,000	59,000	72,050
FY 2028	14,403	14,403	32,808
Total Construction	**1,595,403**	**1,595,403**	**1,595,403**
TEC			
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	195,000	195,000	56,194
FY 2019	253,000	253,000	144,702
FY 2020	250,000	250,000	227,861
FY 2021	197,000	197,000	236,174
FY 2022	198,000	198,000	224,217
FY 2023	69,000	69,000	232,009
FY 2024	104,000	104,000	135,089
FY 2025	132,000	132,000	131,230
FY 2026	124,000	124,000	103,069
FY 2027	59,000	59,000	72,050
FY 2028	14,403	14,403	32,808
Total TEC	**1,595,403**	**1,595,403**	**1,595,403**

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Other Project Costs (OPC)			
FY 2020	2,000	2,000	35
FY 2021	5,000	5,000	56
FY 2022	2,000	2,000	9,444
FY 2023	2,000	2,000	8,844
FY 2024	8,000	8,000	9,121
FY 2025	25,000	25,000	15,000
FY 2026	10,000	10,000	20,000
FY 2027	21,000	21,000	11,000
FY 2028	0	0	1,500
Total, OPC	**75,000**	**75,000**	**75,000**
Total Project Costs (TPC)			
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	195,000	195,000	56,194
FY 2019	253,000	253,000	144,702
FY 2020	252,000	252,000	227,896
FY 2021	202,000	202,000	236,230
FY 2022	200,000	200,000	233,661
FY 2023	71,000	71,000	240,853
FY 2024	112,000	112,000	144,210
FY 2025	157,000	157,000	146,230
FY 2026	134,000	134,000	123,069
FY 2027	80,000	80,000	83,050
FY 2028	14,403	14,403	34,308
Total TPC[a]	**1,670,403**	**1,670,403**	**1,670,403**

[a] The current federal assessment estimates are NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

Table 5.7: Main Process Building Subproject (06-D-141-04)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2006	5,000	5,000	0
FY 2007	5,000	5,000	677
FY 2008	38,583	38,583	33,950
FY 2009	90,622	90,622	79,184
FY 2010	94,000	94,000	80,959
FY 2011	115,271	115,271	109,855
FY 2012	160,194	160,109	170,700
FY 2013	269,069	269,026	192,389
FY 2014 [a]	301,886	301,886	198,448
FY 2015 [b]	270,929	269,823	220,761
FY 2016	298,000	297,978	309,154
FY 2017	179,884	179,748	326,205
FY 2018	9,562	10,954	115,718
Total Design	**1,838,000**	**1,838,000**	**1,838,000**
Construction			
FY 2016	72,000	72,000	4,958
FY 2017	340,116	340,116	54,263
FY 2018	283,438	283,438	177,259
FY 2019	351,000	350,873	349,013
FY 2020	436,000	435,973	473,080
FY 2021	502,500	502,500	550,191
FY 2022	378,700	378,700	494,125
FY 2023	443,106	443,106	613,352
FY 2024	588,000	588,154	568,422
FY 2025	353,000	353,000	410,435
FY 2026	226,000	226,000	213,207
FY 2027	115,000	115,000	145,050
FY 2028	43,210	43,210	78,715
Total Construction	**4,132,070**	**4,132,070**	**4,132,070**
TEC			
FY 2006	5,000	5,000	0
FY 2007	5,000	5,000	677
FY 2008	38,583	38,583	33,950

[a] In FY 2014, $5,000,000 in prior year funding was reprogrammed from 06-D-141, Uranium Processing Facility to Maintenance and Repair of Facilities at Y-12. Change from FY 2018 CPDS also reflects a rescission of $2,114,341.
[b] In FY 2016, $2,885,659 in prior year funding was reprogrammed from 06-D-141, Uranium Processing Facility to Uranium Sustainment: Storage under the Directed Stockpile Work program. Change from FY 2018 CPDS also reflects a rescission of $685,002.

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
FY 2009	90,622	90,622	79,184
FY 2010	94,000	94,000	80,959
FY 2011	115,271	115,271	109,855
FY 2012	160,194	160,109	170,700
FY 2013	269,069	269,026	192,389
FY 2014	301,886	301,886	198,448
FY 2015	270,929	269,823	220,761
FY 2016	370,000	369,978	314,112
FY 2017	520,000	519,864	380,468
FY 2018	293,000	294,392	292,977
FY 2019	351,000	350,873	349,013
FY 2020	436,000	435,973	473,080
FY 2021	502,500	502,500	550,191
FY 2022	378,700	378,700	494,125
FY 2023	443,106	443,106	613,352
FY 2024	588,000	588,154	568,422
FY 2025	353,000	353,000	410,435
FY 2026	226,000	226,000	213,207
FY 2027	115,000	115,000	145,050
FY 2028	43,210	43,210	78,715
Total TEC	**5,970,070**	**5,970,070**	**5,970,070**
Other Project Costs (OPC)			
FY 2005	12,113	12,113	12,113
FY 2006	7,809	7,809	7,809
FY 2007	10,082	10,082	10,082
FY 2008	11,730	11,730	11,730
FY 2009	14,000	14,000	14,000
FY 2010	20,500	20,500	20,500
FY 2011	18,409	18,409	18,409
FY 2012	0	0	0
FY 2013	0	0	0
FY 2014	0	0	0
FY 2015	0	0	0
FY 2016	0	0	0
FY 2017	0	0	0

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	2,000	2,000	1,020
FY 2021	5,500	5,500	1,695
FY 2022	11,500	11,500	10,305
FY 2023	15,000	15,000	10,536
FY 2024	42,000	42,000	42,444
FY 2025	40,000	40,000	36,000
FY 2026	40,000	40,000	36,000
FY 2027	30,000	30,000	35,000
FY 2028	0	0	13,000
Total, OPC	**280,643**	**280,643**	**280,643**
Total Project Costs (TPC)			
FY 2005	12,113	12,113	12,113
FY 2006	12,809	12,809	7,809
FY 2007	15,082	15,082	10,759
FY 2008	50,313	50,313	45,680
FY 2009	104,622	104,622	93,184
FY 2010	114,500	114,500	101,459
FY 2011	133,680	133,680	128,264
FY 2012	160,194	160,109	170,700
FY 2013	269,069	269,026	192,389
FY 2014	301,886	301,886	198,448
FY 2015	270,929	269,823	220,761
FY 2016	370,000	369,978	314,112
FY 2017	520,000	519,864	380,468
FY 2018	293,000	294,392	292,977
FY 2019	351,000	350,873	349,013
FY 2020	438,000	437,973	474,100
FY 2021	508,000	508,000	551,886
FY 2022	390,200	390,200	504,430
FY 2023	458,106	458,106	623,888
FY 2024	630,000	630,154	610,866
FY 2025	393,000	393,000	446,435
FY 2026	266,000	266,000	249,207
FY 2027	145,000	145,000	180,050
FY 2028	43,210	43,210	91,715
Total TPC[a]	**6,250,713**	**6,250,713**	**6,250,713**

[a] The current federal assessment estimates are NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

4. Details of Project Cost Estimate

Table 6: Details of UPF Project (06-D-141)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	1,838,000	1,838,000	1,838,000
Contingency	0	0	0
Total Design	**1,838,000**	**1,838,000**	**1,838,000**
Construction			
Site Preparation	156,214	156,214	191,700
Equipment	1,696,967	1,081,640	1,370,180
Construction	4,033,480	2,456,962	2,419,722
Contingency	469,806	587,780	340,300
Total Construction	**6,356,467**	**4,282,596**	**4,321,902**
Total Estimated Cost (TEC)	**8,194,467**	**6,120,596**	**6,159,902**
Contingency, TEC	*469,806*	*587,780*	*340,300*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	30,000	30,000	30,000
Conceptual Design	64,643	64,643	64,643
Start-up	228,820	225,000	225,000
Contingency	55,200	59,020	59,000
Total OPC	**378,663**	**378,663**	**378,643**
Contingency, OPC	*55,200*	*59,020*	*59,000*
Total Project Cost [abc]	**8,573,130**	**6,499,259**	**6,538,545**
Total Contingency (TEC+OPC)	***525,006***	***646,800***	***399,300***

[a] Allocation of funding and obligations reflects the final TPC of the Substation Subproject. Per DOE O 413.3B, the $16.2 million of cost savings from the Substation Subproject has been returned to the Total Project contingency pool for other Subprojects within this CPDS, the funding for this contingency is from FY 2016.

[b] Excludes a $21,286,000 underrun from the Site Readiness CD-2/3 TPC and an $18,000,000 underrun from the Site Infrastructure and Services CD-2/3 TPC that had been realized prior to establishing the overall UPF CD-2 TPC baseline.

[c] The current federal assessment estimates the cost range for the UPF project as $8.50 to $8.95 billion. The FY 2024 FYNSP funding profile is funded at $8.57 billion and includes a proposed reprogramming of $203.1 million in FY 2023, representing NNSA's current best estimate until the projected is re-baselined.

Table 6.1: Details of Site Readiness Subproject (06-D-141-01)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	43,714	43,714	50,200
Equipment	0	0	0
Construction	0	0	0
Contingency	0	0	13,800
Total Construction	**43,714**	**43,714**	**64,000**
Total Estimated Cost (TEC)	**43,714**	**43,714**	**64,000**
Contingency, TEC	*0*	*0*	*13,800*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	0	0	1000
Contingency	0	0	0
Total OPC	**0**	**0**	**1,000**
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**43,714**	**43,714**	**65,000**
Total Contingency (TEC+OPC)	***0***	***0***	***13,800***

Table 6.2: Details of Site Infrastructure and Services Subproject (06-D-141-05)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	0	0	26,000
Equipment	0	0	0
Construction	60,500	60,500	30,000
Contingency	0	0	22,500
Total Construction	**60,500**	**60,500**	**78,500**
Total Estimated Cost (TEC)	**60,500**	**60,500**	**78,500**
Contingency, TEC	*0*	*0*	*22,500*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	0	0	0
Contingency	0	0	0
Total OPC	**0**	**0**	**0**
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**60,500**	**60,500**	**78,500**
Total Contingency (TEC+OPC)	***0***	***0***	***22,500***

Table 6.3: Details of Substation Subproject (06-D-141-07)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	0	0	3,000
Equipment	0	0	49,700
Construction	43,800	43,800	0
Contingency	0	0	7,300
Total Construction	**43,800**	**43,800**	**60,000**
Total Estimated Cost (TEC)	**43,800**	**43,800**	**60,000**
Contingency, TEC	*0*	*0*	*7,300*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	0	0	0
Contingency	0	0	0
Total OPC	**0**	**0**	**0**
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**43,800**	**43,800**	**60,000**
Total Contingency (TEC+OPC)	***0***	***0***	***7,300***

[a] Allocation of funding and obligations reflects the final TPC of the Substation Subproject. The approximately $16.2 million of cost savings from the Substation Subproject has been redeployed to MEB to cover a TPC increase.

Table 6.4: Details of Mechanical Electrical Building Subproject (06-D-141-06)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	0	0	0
Equipment	86,180	75,600	86,040
Construction	222,800	193,800	159,760
Contingency	0	39,580	38,200
Total Construction	**308,980**	**308,980**	**284,000**
Total Estimated Cost (TEC)	**308,980**	**308,980**	**284,000**
Contingency, TEC	*0*	*39,580*	*38,200*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	1,020	1,000	0
Contingency	0	20	0
Total OPC	**1,020**	**1,020**	**0**
Contingency, OPC	*0*	*20*	*0*
Total Project Cost	**310,000**	**310,000**	**284,000**
Total Contingency (TEC+OPC)	***310,000***	***310,000***	***284,000***
BCP Approved in February 2022	**310,000**		

Table 6.5: Details of Process Support Facilities Subproject (06-D-141-08)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	0	0	0
Equipment	26,600	18,600	19,530
Construction	127,100	80,400	75,970
Contingency	18,300	19,000	22,500
Total Construction	**172,000**	**118,000**	**118,000**
Total Estimated Cost (TEC)	**172,000**	**118,000**	**118,000**
Contingency, TEC	*18,300*	*19,000*	*22,500*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	21,800	18,000	18000
Contingency	200	4,000	4000
Total OPC	**22,000**	**22,000**	**22,000**
Contingency, OPC	*200*	*4,000*	*4,000*
Total Project Cost	**194,000**	**140,000**	**140,000**
Total Contingency (TEC+OPC)	***18,500***	***23,000***	***26,500***

Table 6.6: Details of Salvage and Accountability Building Subproject (06-D-141-09)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	0	0	0
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Site Preparation	0	0	0
Equipment	301,777	187,920	380,160
Construction	1,184,317	681,080	599,840
Contingency	109,309	236,000	125,000
Total Construction	**1,595,403**	**1,105,000**	**1,105,000**
Total Estimated Cost (TEC)	**1,595,403**	**1,105,000**	**1,105,000**
Contingency, TEC	*109,309*	*236,000*	*125,000*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	0	0	0
Conceptual Design	0	0	0
Start-up	60,000	60,000	60,000
Contingency	15,000	15,000	15,000
Total OPC	**75,000**	**75,000**	**75,000**
Contingency, OPC	*15,000*	*15,000*	*15,000*
Total Project Cost[a]	**1,670,403**	**1,180,000**	**1,180,000**
Total Contingency (TEC+OPC)	***124,309***	***251,000***	***140,000***

[a] The current federal assessment estimates are NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

Table 6.7: Details of Main Process Building Subproject (06-D-141-04)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	1,838,000	1,838,000	1,838,000
Contingency	0	0	0
Total Design	**1,838,000**	**1,838,000**	**1,838,000**
Construction			
Site Preparation	112,500	112,500	112,500
Equipment	1,282,410	799,520	834,750
Construction	2,394,963	1,397,382	1,554,152
Contingency	342,197	293,200	111,000
Total Construction	**4,132,070**	**2,602,602**	**2,612,402**
Total Estimated Cost (TEC)	**5,970,070**	**4,440,602**	**4,450,402**
Contingency, TEC	*342,197*	*293,200*	*111,000*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	30,000	30,000	30,000
Conceptual Design	64,643	64,643	64,643
Start-up	146,000	146,000	146,000
Contingency	40,000	40,000	40,000
Total OPC	**280,643**	**280,643**	**280,643**
Contingency, OPC	*40,000*	*40,000*	*40,000*
Total Project Cost[a]	**6,250,713**	**4,721,245**	**4,731,045**
Total Contingency (TEC+OPC)	***382,197***	***333,200***	***151,000***

[a] The current federal assessment estimates are NNSA's best estimates until the projected is re-baselined. Includes a portion of the proposed reprogramming of $203.1 million in FY 2023.

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY2022	FY2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
FY 2011	TEC	1,233,620	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	1,499,649	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2012	TEC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2013	TEC	2,254,185	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	129,128	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	2,383,313	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2014	TEC	3,436,047	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	174,313	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	3,610,360	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2015	TEC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	3,525,096	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2016	TEC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	OPC	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	TPC	4,050,096	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
FY 2017	TEC	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,055,096	645,000	500,000	250,000	49,904	0	0	0	6,500,000
FY 2018	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,420,096	630,000	385,000	64,904	0	0	0	0	6,500,000
FY 2019	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,415,411	620,000	300,000	159,000	5,589	0	0	0	6,500,000
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,415,411	620,000	300,000	164,589	0	0	0	0	6,500,000
FY 2021	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,415,411	620,000	300,000	164,589	0	0	0	0	6,500,000
FY 2022	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,415,411	524,000	0	0	0	0	0	0	6,500,000
FY 2023	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	5,415,411	600,000	362,000	122,589	0	0	0	0	6,500,000
FY 2024	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC[a]	5,415,411	600,000	565,106	760,000	550,000	400,000	225,000	57,613	8,573,130

[a] The current federal assessment estimates the cost range for the UPF project as $8.50 to $8.95 billion. The FY 2024 FYNSP funding profile is funded at $8.57 billion, including a proposed reprogramming of $203.1 million in FY 2023, representing NNSA's best estimate until the projected is re-baselined.

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	3/31/2029
Expected Useful Life	50 years
Expected Future Start of D&D of this capital asset (fiscal quarter)	3/31/2079

Related Funding Requirements
(Budget Authority in Billions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	$0.466	$0.466	$32.915	$32.915

7. D&D Information

The new area being constructed in this project is replacing existing facilities.

New Area being constructed at Y-12 National Security Complex	568,524 square feet
Area of D&D in this project at Y-12 National Security Complex	11,000 square feet[a]

Area at Y-12 National Security Complex to be transferred, sold, and/or D&D outside the project, including area previously "banked" 1,202,000 square feet

Area of D&D of this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project, including area previously "banked"	0
Total Area Eliminated	N/A

8. Acquisition Approach

The NNSA Federal Project Director and the Integrated Project Team are responsible for the execution of the project. The Y-12 M&O contractor is the designated design authority. Designated officials within the Office of Defense Programs (NA-10) are responsible for defining program requirements and identifying project scope changes. The Office of Infrastructure is responsible for providing support for alternative studies and serves as the lead NNSA office for design and construction of the project.

The UPF Project construction scope is being performed under firm fixed price contracts or subcontracts along with cost-plus contracts as determined to be the best value for the government. The Department is administering Architect-Engineer and construction contracts utilizing the M&O contract and stand-alone contract vehicles. The United States Army Corps of Engineers (USACE) and Tennessee Valley Authority have had acquisition and project management responsibility for appropriate scopes of work as determined by the Department.

[a] Building 9107.

Chemistry and Metallurgy Research Replacement (CMRR) Project, 04-D-125
Los Alamos National Laboratory (LANL), Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary:
The Fiscal Year (FY) 2024 Request for the Chemistry and Metallurgy Research Replacement (CMRR) Project is $227,122,000, supporting subprojects for equipment installation in the Plutonium Facility 4 (PF-4) and the Radiological Laboratory and Utility Office Building (RLUOB), and associated infrastructure for related operations in and around the two facilities.

The CMRR Project provides continuity in analytical chemistry (AC) and materials characterization (MC) capabilities through the relocation of programmatic operations from the existing Chemistry and Metallurgy Research (CMR) facility and provides infrastructure and support facilities for consolidated operations at the Technical Area -55 (TA-55) site.

Significant Changes:
The FY 2024 Construction Project Data Sheet (CPDS) is an update from FY 2023 and does not include a new start for the budget year. This data sheet updates the project to include, a) previously completed subprojects and b) continuation of the PF-4 Equipment Installation Phase 2 (PEI2) and RLUOB Hazard Category 3 (RC3) subprojects in design and execution planning.

Critical Decision (CD)-1 for all remaining subprojects was approved on August 21, 2014, with a combined CMRR top end of total project cost (TPC) range of $2,886,230,000. Portions of the CMRR Project scope have yet to be baselined so that the overall project TPC remains at or under the high-end of the CD-1 range. NNSA is determining the critical scope for CMRR in light of priorities for pit production, ceasing programmatic operations at the CMR facility, and supporting infrastructure for TA-55. Until this analysis and planning is complete, NNSA has constrained funding for this project to its current understanding of the critical scope, with a prioritization of scope in the PEI2 subproject. While the Project Cost History tables below show the project funded to the high-end of the CD-1 range, the FY 2024 FYNSP assumes a TPC for RC3 of $282 million, which NNSA currently assesses will meet the project's mission need. However, NNSA will complete the planning for the prioritized scope for CMRR during FY 2023, and revise outyear funding requirements as necessary. FY 2024 funding will be used to complete design and continue construction. A prioritized and phased execution strategy will be used for the remaining scope on PEI2 and RC3 to support the increased programmatic work and construction occurring in TA-55 and at the site.

The current CMRR subprojects are listed below. Changes in subproject scope and phasing strategy may be identified as scope is prioritized, and design and acquisition plans mature. Completed subprojects are described in Section 2 of this document.

RLUOB Subproject (04-D-125-01): *COMPLETE* - CD-4 approved on June 24, 2010.

RLUOB Equipment Installation (REI1) Subproject (04-D-125-02): *COMPLETE* - CD-4 approved on June 20, 2013.

Nuclear Facility (NF) Subproject (04-D-125-03): *CANCELLED* - This subproject was cancelled.

REI2 Subproject (04-D-125-04): *COMPLETE – CD*-4 approved on December 15, 2021, one month ahead of schedule. The approved project cost at CD-4 was $509,300,000, $124,000,000 below the TPC. The project is currently in final cost closeout and financial reconciliation. The tables below reflect the current cost to date of $513,544,000. Underruns for this subproject have been reallocated to the PEI2 and RC3 subprojects.

PEI1 Subproject (04-D-125-05): *COMPLETE* – CD-4 approved on January 8, 2021, more than one year ahead of schedule. The approved project cost at CD-4 was $284,000,000; $109,000,000 below the TPC. The project has completed final cost closeout and financial reconciliation. The tables below reflect the final cost of $277,173,000. Underruns for this subproject have been reallocated to the PEI2 and RC3 subprojects.

PEI2 Subproject (04-D-125-06): Maximizes use of PF-4 by consolidating and relocating existing capabilities, replacing existing equipment, installing gloveboxes and equipment, demolition, and disposal (D&D) of existing PF-4 laboratory space for AC/MC capabilities and development of infrastructure supporting AC/MC mission relocation to TA-55. PEI2 will establish enduring AC and MC capabilities for supporting NNSA actinide-based missions. PEI2 also improves TA-55 and PF-4 personnel and vehicular ingress/egress, levels of worker preparation/staging and warehousing for relocated AC/MC operations and personnel. See Section 4 of this datasheet for additional detail on *Project Scope and Justification*. Underruns from the PEI1 and REI2 are utilized to fund performance baselines for all scope elements of the project. The project will maintain the top end of the range established at CD-1. CD-3A, D&D in the 200 Area, was approved March 2015 at $88.2 million, congressionally paused in 2017, and restarted in March 2022. CD-3B, Change Room Expansion and Post 118 expansion, was approved in February 2021 at $89 million. CD-3C, Long-Lead Equipment Procurement, was approved in December 2022 at $53.9 million. The schedule range for completion is currently FY 2026 to FY 2029. In support of programmatic need dates, personnel and vehicular ingress/egress, levels of worker preparation/staging will need to achieve CD 2/3 sooner than PEI2 Equipment. An integrated master schedule will be developed for CD-2/3 approval which is forecasted for third quarter 2023.

RC3 Subproject (04-D-125-07): Maximizes use of RLUOB by reconfiguring existing laboratory space and equipping the remaining empty laboratories with AC and MC capabilities. Prior to the equipment installation, RC3 supports activities necessary to upgrade the RLUOB from a Radiological Facility to a Hazard Category 3 Nuclear Facility. The subsequent RC3 equipment installation will establish enduring AC and MC capabilities for supporting NNSA actinide-based missions and provide for increased reliability of the pit production mission. The RC3 subproject also includes an office building and warehouse as part of the scope. The office and warehouse space will support enduring Pu missions. Underruns from the PEI1 and REI2 are utilized to fund performance baselines for all scope elements of the project. The project will maintain the top end of the range established at CD-1. The schedule range for completion is currently FY 2026 to FY 2028 and an integrated master schedule will be developed for CD-2/3 which is forecasted for third quarter 2024.

A Level 4 Federal Project Director has been appointed to this project and has approved this data sheet.

Critical Milestone History[a]

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2004	07/16/2002	N/A	1Q FY 2004		N/A	2Q FY 2004	N/A	1Q FY 2011
FY 2005	07/16/2002	N/A	3Q FY 2004		N/A	3Q FY 2005	N/A	3Q FY 2012
FY 2006	07/16/2002	N/A	2Q FY 2005	4Q FY 2005	N/A	1Q FY 2006	N/A	4Q FY 2010
FY 2007	07/16/2002	N/A	09/30/2005	1Q FY 2006	N/A	1Q FY 2006	N/A	1Q FY 2013
FY 2008	07/16/2002	N/A	09/30/2005	10/21/2005	N/A	1Q FY 2006	N/A	1Q FY 2013
FY 2009	07/16/2002	N/A	09/30/2005	TBD	N/A	TBD	N/A	TBD
FY 2010	07/16/2002	N/A	09/30/2005	TBD	N/A	TBD	N/A	TBD
FY 2011	07/16/2002	N/A	05/18/2005	TBD	N/A	TBD	N/A	TBD
FY 2012	07/16/2002	N/A	05/18/2005	4Q FY 2012	N/A	4Q FY 2012	N/A	TBD
FY 2012 Rep	07/16/2002	N/A	05/18/2005	TBD	TBD	TBD	N/A	TBD
FY 2016	07/16/2002	N/A	4QFY2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	4Q FY 2019	4Q FY 2024
FY 2017	07/16/2002	N/A	08/21/2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	4Q FY 2019	4Q FY 2024
FY 2018	07/16/2002	N/A	08/21/2014	2Q FY 2022	3Q FY 2021	2Q FY 2022	4Q FY 2026	4Q FY 2026
FY 2019	07/16/2002	N/A	08/21/2014	4Q FY 2022	4Q FY 2022	4Q FY 2022	4Q FY 2026	4Q FY 2026
FY 2020	07/16/2002	N/A	08/21/2014	10/31/2016	12/1/2016	10/31/2016	N/A	3Q FY 2022
FY 2021	07/16/2002	N/A	08/21/2014	1Q FY 2023	2Q FY 2023	2Q FY 2023	4Q FY 2025	4Q FY 2029
FY 2022	07/16/2002	N/A	08/21/2014	4Q FY 2023	4Q FY 2023	4Q FY 2023	3Q FY 2028	4Q FY 2029
FY 2023	07/16/2002	N/A	08/21/2014	3Q FY 2024	2Q FY 2024	3Q FY 2024	4Q FY 2029	4Q FY 2029
FY 2024	07/16/2002	N/A	08/21/2014	3Q FY 2024	2Q FY 2024	3Q FY 2024	4Q FY 2029	4Q FY 2029[b]

RLUOB Subproject (04-D-125-01)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2011	07/16/2002	N/A	05/18/2005	10/21/2005	N/A	10/21/2005	N/A	02/28/2010
FY 2012	07/16/2002	N/A	05/18/2005	10/21/2005	N/A	10/21/2005	N/A	06/24/2010
FY 2012 Rep	07/16/2002	N/A	05/18/2005	10/21/2005	N/A	10/21/2005	N/A	06/24/2010[c]

REI1 Subproject (04-D-125-02)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2011	07/16/2002	N/A	05/18/2005	07/17/2009	N/A	07/17/2009	N/A	04/30/2013
FY 2012	07/16/2002	N/A	05/18/2005	07/17/2009	N/A	07/17/2009	N/A	04/30/2013
FY 2012 Rep	07/16/2002	N/A	05/18/2005	07/17/2009	N/A	07/17/2009	N/A	06/30/2013[d]

[a] Critical milestone history reflects no milestones in FY2013, FY2014 and FY2015 since no budget requests were submitted in these years.

[b] These dates reflect current planning estimates and will be revised when the remaining subprojects are baselined.

[c] This subproject is complete, and the project history has not changed.

[d] This subproject is complete, and the project history has not changed.

Nuclear Facility (NF) Subproject (04-D-125-03)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2011	07/16/2002	N/A	05/18/2005	TBD	N/A	TBD	N/A	TBD
FY 2012	07/16/2002	N/A	05/18/2005	4Q FY 2012	N/A	4Q FY 2012	N/A	TBD
FY 2012 Rep	07/16/2002	N/A	05/18/2005	TBD	TBD	TBD	N/A	TBD
FY 2016	07/16/2002	N/A	05/18/2005	Cancelled	Cancelled	Cancelled	N/A	Cancelled[a]

REI2 Subproject (04-D-125-04)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2016	07/16/2002	8/21/2014	8/21/2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	N/A	1Q FY 2020
FY 2017	07/16/2002	8/21/2014	8/21/2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	N/A	1Q FY 2020
FY 2018 PB	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	2Q FY 2022
FY 2019	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	2Q FY 2022
FY 2020	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	2Q FY 2022
FY 2021	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	2Q FY 2022
FY 2022	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	2Q FY 2022
FY 2023	07/16/2002	8/21/2014	8/21/2014	10/31/2016	4/6/2016	10/31/2016	N/A	12/20/2021

Fiscal Quarter or Date

Fiscal Year	CD-3A	CD-3B
FY 2016	12/18/2014	2Q FY 2015
FY 2017	12/18/2014	12/22/2015
FY 2018	12/18/2014	12/22/2015
FY 2019	12/18/2014	12/22/2015
FY 2020	12/18/2014	12/22/2015
FY 2021	12/18/2014	12/22/2015
FY 2022	12/18/2014	12/22/2015
FY 2023	12/18/2014	12/22/2015

CD-3A – Approve Long-Lead Procurements
CD-3B – Approve Long-Lead Procurements

[a] This subproject was canceled, and the project history has not changed.

PEI1 Subproject (04-D-125-05)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2016	07/16/2002	4Q FY 2015	4Q FY 2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	4Q FY 2019	1Q FY 2024
FY 2017	07/16/2002	8/21/2014	08/21/2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	4Q FY 2019	1Q FY 2020
FY 2018 PB	07/16/2002	8/21/2014	08/21/2014	10/31/2016	12/1/2016	10/31/2016	4Q FY 2019	3Q FY 2022
FY 2019	07/16/2002	8/21/2014	08/21/2014	10/31/2016	12/1/2016	10/31/2016	4Q FY 2019	3Q FY 2022
FY 2020	07/16/2002	8/21/2014	08/21/2014	10/31/2016	12/1/2016	10/31/2016	4Q FY 2019	3Q FY 2022
FY 2021	07/16/2002	8/21/2014	08/21/2014	10/31/2016	12/1/2016	10/31/2016	4Q FY 2019	3Q FY 2022
FY 2022	07/16/2002	8/21/2014	08/21/2014	10/31/2016	12/1/2016	10/31/2016	11/12/2019	1/08/2021[a]

Fiscal Quarter or Date

Fiscal Year	CD-3A	CD-3B
FY 2016	03/18/2015	12/22/2015
FY 2017	03/18/2015	12/22/2015
FY 2018	03/18/2015	12/22/2015
FY 2019	03/18/2015	12/22/2015
FY 2020	03/18/2015	12/22/2015
FY 2021	03/18/2015	12/22/2015
FY 2022	03/18/2015	12/22/2015

CD-3A – Approve Long-Lead Procurements
CD-3B – Approve Long-Lead Procurements

[a] This subproject is complete, and the project history has not changed.

PEI2 Subproject (04-D-125-06)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2016	07/16/2002	8/21/2014	4Q FY 2014	3Q FY 2016	2Q FY 2016	3Q FY 2016	4Q FY 2019	1Q FY 2024
FY 2021	07/16/2002	8/21/2014	8/21/2014	2Q FY 2023	2Q FY 2023	2Q FY 2023	4Q FY 2025	4Q FY 2028
FY 2022	07/16/2002	8/21/2014	8/21/2014	3Q FY 2023	3Q FY 2023	3Q FY 2023	3Q FY 2028	4Q FY 2029
FY 2023	07/16/2002	8/21/2014	8/21/2014	3Q FY 2023	2Q FY 2023	3Q FY 2023	4Q FY 2029	4Q FY 2029
FY 2024	07/16/2002	8/21/2014	8/21/2014	3Q FY 2023	2Q FY 2023	3Q FY 2023	4Q FY 2029	4Q FY 2029

Fiscal Quarter or Date

Fiscal Year	CD-3A	CD-3B	CD-3C
FY 2016	03/18/2015		
FY 2017	03/18/2015		
FY 2018	03/18/2015		
FY 2019	03/18/2015		
FY 2020	03/18/2015		
FY 2021	03/18/2015	2Q FY 2022	
FY 2022	03/18/2015	02/03/2021	
FY 2023	03/18/2015	02/09/2021	
FY 2024	03/18/2015	02/09/2021	12/28/2022

CD-3A – D&D of Room 200 Area
CD-3B – Infrastructure scope/early site security/access
CD-3C – Approve Long-Lead Procurements

RC3 (04-D-125-07)

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2016	07/16/2002	08/21/2014	4Q FY 2014	3Q FY 2018	2Q FY 2017	4Q FY 2017	N/A	1Q FY 2024
FY 2021	07/16/2002	08/21/2014	4Q FY 2014	2Q FY 2023	2Q FY 2023	2Q FY 2023	N/A	4Q FY 2028
FY 2022	07/16/2002	08/21/2014	8/21/2014	4Q FY 2023	4Q FY 2023	1Q FY 2024	N/A	4Q FY 2028
FY 2023	07/16/2002	08/21/2014	8/21/2014	3Q FY 2024	2Q FY 2024	3Q FY 2024	N/A	4Q FY 2028
FY 2024	07/16/2002	08/21/2014	8/21/2014	3Q FY 2024	2Q FY 2024	3Q FY 2024	N/A	4Q FY 2028

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Project Cost History[a]

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2004	N/A	N/A	500,000	100,000	N/A	N/A	600,000
FY 2005	N/A	N/A	500,000	100,000	N/A	N/A	600,000
FY 2006	N/A	N/A	750,000	100,000	N/A	N/A	850,000
FY 2007	N/A	N/A	738,097	100,000	N/A	N/A	838,097
FY 2008	65,939	672,158	738,097	100,000	N/A	N/A	838,098
FY 2009	TBD	TBD	TBD	TBD	N/A	TBD	TBD
FY 2010	65,138	TBD	TBD	TBD	N/A	TBD	TBD
FY 2016	63,646	2,295,936	2,359,582	463,721	54,000	517,721	2,877,303
FY 2017	63,646	2,243,436	2,307,082	516,221	54,000	570,221	2,877,303
FY 2018	63,573	2,209,842	2,273,415	549,815	54,000	603,815	2,877,230
FY 2019	63,573	2,209,069	2,272,642	550,588	54,000	604,588	2,877,230
FY 2020	63,573	1,492,091	1,555,664	336,089	N/A	336,089	1,891,753[b]
FY 2021	63,573	2,209,069	2,272,642	550,588	54,000	604,588	2,877,230
FY 2022	63,573	2,241,987	2,305,560	526,670[c]	54,000	580,670	2,886,230
FY 2023	63,573	2,293,647	2,357,220	493,730	35,280	529,010	2,886,230
FY 2024	63,573	2,330,426	2,393,999	492,231	0	492,231	2,886,230[d]

RLUOB Subproject (04-D-125-01)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2011	N/A	159,130	159,130	4,870	N/A	4,870	164,000
FY 2012	N/A	159,130	159,130	4,870	N/A	4,870	164,000
FY 2012 Rep	N/A	159,130	159,130	4,870	N/A	4,870	164,000
FY 2016[e]	N/A	194,130	194,130	4,870	N/A	4,870	199,000

[a] Project cost history reflects no milestones in FY 2013, FY 2014 and FY 2015 since no CPDS or budget requests were submitted in these years.

[b] In the FY 2020 CMRR Data Project Data Sheet the PEI2 and RC3 subprojects were removed from the CMRR project and funded under the Plutonium Pit Production Project in accordance with the Conference Report.

[c] The published FY 2022 CPDS OPC was incorrectly stated as $520,035,000. The rest of the FY 2022 numbers were correct. The FY 2022 number has been updated to correct this previous typographical error in the FY 2022 submittal.

[d] Until performance baselines are established for the remaining subprojects, the top of CD-1 range will be maintained.

[e] This subproject is complete, and the project history has not changed.

REI1 Subproject (04-D-125-02)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2011	N/A	152,900	152,900	46,500	N/A	46,500	199,400
FY 2012	N/A	152,900	152,900	46,500	N/A	46,500	199,400
FY 2012 Rep	N/A	152,900	152,900	46,500	N/A	46,500	199,400
FY 2016[a]	N/A	151,963	151,963	44,797	N/A	44,797	196,760

NF Subproject (03-D-103 and 04-D-125-03)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2011	65,138	TBD	TBD	TBD	N/A	TBD	TBD
FY 2012	65,138	3,239,862 – 5,169,862	3,305,000 – 5,235,000	405,000 - 625,000	N/A	405,000- 625,000	3,710,000 - 5,860,000
FY 2012 Rep	65,138	TBD	TBD	4,870	N/A	TBD	TBD
FY 2016	63,646	391,324	454,970	40,274	N/A	40,274	495,244
FY 2017	63,646	391,324	454,970	40,274	N/A	40,274	495,244
FY 2018[b]	63,573	336,919	400,492	39,054	N/A	39,054	439,546

REI2 Subproject (04-D-125-04)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2016	0	540,000	540,000	135,000	N/A	135,000	675,000
FY 2017	0	540,000	540,000	135,000	N/A	135,000	675,000
FY 2018 PB	0	488,040	488,040	145,210	N/A	145,210	633,250
FY 2019	0	488,040	488,040	145,210	N/A	145,210	633,250
FY 2020	0	488,040	488,040	145,210	N/A	145,210	633,250
FY 2021	0	488,040	488,040	145,210	N/A	145,210	633,250
FY 2022	0	451,517	451,517	111,090	N/A	111,090	562,607
FY 2023	0	410,659	410,659	106,191	N/A	106,191	516,850
FY 2024	0	410,201	410,201	103,343	N/A	103,343	513,544[c]

PEI1 Subproject (04-D-125-05)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2016	0	1,071,000	1,071,000	240,000	54,000	294,000	1,365,000
FY 2017	0	257,595	257,595	57,405	N/A	57,405	315,000

[a] This subproject is complete, and the project history has not changed.

[b] This subproject was canceled, and the project history has not changed.

[c] REI2 achieved CD-4, with an approved TPC of $509,300,000. The subproject is currently in final costs closeout and this number will be updated to reflect the final TPC value after closeout is completed. The tables reflect the current cost to date of $513,544. Consistent with DOE O 413.3B, any TPC savings from CMRR subprojects are being used for execution of other CMRR subprojects as needed.

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2018 PB	0	292,300	292,300	101,700	N/A	101,700	394,000
FY 2019	0	292,300	292,300	101,700	N/A	101,700	394,000
FY 2020	0	292,300	292,300	101,700	N/A	101,700	394,000
FY 2021	0	292,300	292,300	101,700	N/A	101,700	394,000
FY 2022	0	231,400	231,400	52,600	N/A	52,600	284,000
FY 2023	0	220,701	220,701	56,905	N/A	56,905	277,606
FY 2024	0	220,719	220,719	56,454	N/A	56,454	277,173[a]

[a] PEI1 achieved CD-4 in January 2021 with an approved TPC of $284,000,000, the subproject is currently completing financial closeout and the actual will be updated to reflect the final costs in the next project data sheet. The tables reflect the current costs to date of $277,173,000.

PEI2 Subproject (04-D-125-06)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2016	0	471,500	471,500	159,500	54,000	213,500	685,000
FY 2020	0	28,739	28,739	296	N/A	296	29,035
FY 2021	0	475,242	475,242	146,098	54,000	200,098	675,340
FY 2022	0	538,662	538,662	156,533	54,000	210,533	749,195[a]
FY 2023	0	590,413	590,413	118,356	35,280	153,636	744,049
FY 2024	0	625,693	625,693	118,356	0	118,356	744,049

RC3 (04-D-125-07)

($K)

Fiscal Year	TEC, Design 03-D-103	TEC, Design/Construction 04-D-125	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2016	0	289,405	289,405	75,595	N/A	75,595	365,000
FY 2020	0	0	0	162	N/A	162	162
FY 2021	0	270,475	270,475	68,859	N/A	68,859	339,334
FY 2022	0	337,396	337,396	117,726	N/A	117,726	455,122[b]
FY 2023	0	388,862	388,862	123,557	N/A	123,557	512,419
FY 2024	0	390,801	390,801	125,357	N/A	125,357	516,158

2. Project Scope and Justification

Scope

The CMRR Project, as originally proposed, relocated, and consolidated mission critical AC, material MC, and actinide research and development (R&D) capabilities; and provided special nuclear material (SNM) storage and large vessel handling capabilities. The SNM storage and large vessel handling capabilities originally planned for CMRR-NF are not included in the current set of CMRR subprojects and have been addressed by programmatic operations. This data sheet provides information related to the two ongoing subprojects to transition AC and MC capabilities into RLUOB and PF-4, to ensure continuity in plutonium support capabilities and enable the cessation of program operations in CMR.

Changes in subproject and phasing strategy may be identified as design, funding, and acquisition plans mature. The list of CMRR line-item subprojects since inception are:

RLUOB Subproject (04-D-125-01): Construction of a 203,686 gross square foot (gsf) facility to house laboratory space capable of handling radiological quantities of SNM; a 22,071 gsf utility building sized to provide utility services (including chilled and hot water, potable hot/cold water, compressed air, and process gases) for all CMRR facility elements; office space for CMRR workers located outside of perimeter security protection systems; and space for centralized TA-55 training activities. The RLUOB became fully functional and operational after the completion of the equipment installation effort for this facility in the REI phase.

[a] The high end of the current cost range of the subproject was increased to reflect the completion of PEI1 and REI2 subprojects and application of the underruns to the existing scope. The underruns are being used/made available to address existing scope as performance baselines are established. Until a performance baseline for all scope elements of the project is achieved, the project will maintain the top end of the range established at CD-1.

[b] The high end of the current cost range of the subproject was increased to reflect the completion of PEI1 and REI2 subprojects and application of the underruns to the existing scope. The underruns are being used/made available to address existing scope as performance baselines are established. Until a performance baseline for all scope elements of the project is achieved, the project will maintain the top end of the range established at CD-1.

- **RLUOB Equipment Installation (REI) Subproject (04-D-125-02):** Equipment installation included gloveboxes, hoods, AC/MC instrumentation, security and communication hardware, and final facility tie-ins and operational readiness/turnover activities. RLUOB equipment fabrication, installation, testing, and acceptance physically completed in FY 2012. Staff occupation of the office spaces in FY 2012 occurred and CD-4 was approved. The facility exceeded its sustainability goal of LEED Silver by achieving LEED Gold in June 2012.

- **Nuclear Facility (NF) Subproject (04-D-125-03):** This subproject is cancelled with the remaining mission need (excluding SNM storage and large vessel handling) for CMRR to be met by REI2, PEI1, PEI2 and RC3.

- **REI Phase 2 (REI2) Subproject (04-D-125-04):** Maximizes the use of RLUOB laboratories by both reconfiguring some existing laboratory space and equipping empty laboratories with AC and MC capabilities. Until the RC3 subproject is complete, the RLUOB will operate at the increased radiological limit, 38.6 g of Pu-239 equivalent, consistent with the new limit established by NNSA Supplemental Guidance NA-1 SD G 1027, which enables additional AC and MC operations to move in. New gloveboxes/hoods and equipment will be installed in RLUOB through this subproject. This project makes progress toward ceasing program operations in CMR. Specific capabilities in REI2 scope include the following:

    - Trace Elements Sample Preparation
    - Mass Spectrometry Sample Preparation
    - X-Ray Fluorescence Sample Preparation and Instruments
    - Radiochemistry Counting Laboratory and Sample Preparation
    - Oxide and Metal Sample Distribution
    - Coulometry
    - AC and MC Capabilities for R&D and Troubleshooting

- **PF-4 Equipment Installation Phase 1 (PEI1) Subproject (04-D-125-05):** The PEI1 subproject involved the following: relocation of existing PF-4 processes within PF-4 to create open consolidated space, reusing existing gloveboxes for new processes, decontamination and decommissioning (D&D) of old gloveboxes/equipment in PF-4 to create open laboratory space; and installation of new gloveboxes/equipment in the created open space. PEI1 supports the AC and MC capabilities that require the processing of larger amounts of nuclear material. This project made progress toward ceasing program operations in CMR. These capabilities support pit production, pit surveillance, plutonium science and other national security programs. The removal work was executed as site-prep work within this subproject. Specific capabilities in PEI1 scope included:

    - Sample Preparation Surface Science
    - Mechanical Testing
    - Physical Properties
    - Small Sample Fabrication and Preparation

- **PF-4 Equipment Installation Phase 2 (PEI2) Subproject (04-D-125-06):** This scope will maximize use of PF-4 by consolidating and relocating existing capabilities within PF-4, replacing existing equipment, installing gloveboxes and equipment and decontamination and demolition of existing laboratory equipment to create space for relocated AC/MC equipment. PEI2 will establish enduring AC and MC capabilities for supporting NNSA actinide-based missions, including pit production. PEI2 if needed will accomplish infrastructure scope necessary to support the CMRR project, and to accommodate the relocation of personnel and supporting facilities to TA-55. Included are facilities upgrades and new construction of:

    - Increased capacity for change rooms leading into PF-4.
    - Upgrade in capacity for vehicular entrance/exit to and from TA-55.
    - Upgrades to existing PF-4 ingress/egress security posts for essential capacity increases related to CMRR missions.

    The cost estimate will be updated prior to CD-2/3 approval for this subproject. An integrated master schedule will be developed for CD-2/3.

- **RLUOB Hazard Category 3 (RC3) (04-D-125-07):** This scope will maximize use of RLUOB by reconfiguring existing laboratory space and equipping the remaining empty laboratories with AC and MC capabilities and supports the conversion of the Radiological Laboratory to a Hazard Category 3 Nuclear Facility. RC3 equipment installation will establish enduring AC and MC capabilities for supporting NNSA actinide-based missions. RC3 also includes new construction of:

  - Office building in the vicinity of TA-55 in support of enduring Pu missions.
  - Warehousing for handling of equipment procurement/inspection/preparation/installation in support of enduring Pu missions.

  The cost estimate will be updated prior to CD-2/3 approval for this subproject. An integrated master schedule will be developed for CD-2/3.

Justification

As defined in the most recent revision of the Mission Need Statement (MNS), the mission of the CMRR Project is to ensure continuity in AC and MC capabilities for NNSA actinide-based missions in support of stockpile stewardship. The AC and MC capabilities provided by this project support pit production, pit surveillance, plutonium science and other national security programs. During development of the plutonium strategy, the joint Department of Defense-Cost Analysis and Program Evaluation business case analysis indicated that optimizing RLUOB and repurposing space in PF-4 should be started as soon as possible to maintain continuity in AC and MC capabilities.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B.

Funds appropriated under this data sheet may be used for contracted support services to the Federal Project Director to conduct independent assessments of the planning and execution of this project required by DOE O 413.3B and to conduct technical reviews of design and construction documents.

Key Performance Parameters (KPPs)

PF-4 Equipment Installation Phase 2 (PEI2) Subproject (04-D-125-06) This scope will maximize use of PF-4 by consolidating and relocating existing capabilities into Room 209, replacing existing equipment, installing gloveboxes and equipment and D&D of existing laboratory space for AC/MC capabilities, and will be referenced in the PEI2 Transition to Operations (TTO) Plan and PEP section for Transition to Operations once developed in preparation for CD-2.

RLUOB Hazard Category 3 (RC3) (04-D-125-07): This scope will maximize use of RLUOB by reconfiguring existing laboratory space and equipping the remaining empty laboratories with AC and MC systems. Capabilities will be referenced in the RC3 Transition to Operations (TTO) Plan and PEP section for Transition to Operations once developed in preparation for CD-2.

3. Financial Schedule

Prior Subprojects (RLUOB/REI/Nuclear Facility) 03-D-103-010[a] & 04-D-125-01, -02, -03)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (03-D-103-010)			
Prior Years - FY 2018	63,573	63,573	63,573
Total Design (03-D-103-010)	**63,573**	**63,573**	**63,573**
Design (04-D-125)			
Prior Years - FY 2018	386,929	386,929	386,929
Total Design (04-D-125)	**386,929**	**386,929**	**386,929**
Total Design			
Prior Years - FY 2018	450,502	450,502	450,502
Total Design	**450,502**	**450,502**	**450,502**
Construction			
Prior Years - FY 2018	296,083	296,083	296,083
Total Construction	**296,083**	**296,083**	**296,083**
TEC			
Prior Years - FY 2018	746,585	746,585	746,585
Total TEC	**746,585**	**746,585**	**746,585**
Other Project Costs (OPC)			
(OPC non capital)			
Prior Years - FY 2018	88,721	88,721	88,721
Total Project Costs (TPC)	**88,721**	**88,721**	**88,721**
Prior Years - FY 2018			
Total TPC	**835,306**	**835,306**	**835,306**

[a] 03-D-103-010 CPDS funded design efforts on multiple line-item projects starting in 2003. Subsequently the funding of design and construction was shifted to 04-D-125.

REI Phase 2 (REI2) Subproject (04-D-125-04)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (04-D-125-04)			
Prior Years - FY 2018	42,179	42,179	42,179
FY 2019	333	333	333
FY 2020	0	0	0
FY 2021	0	0	0
Total Design (04-D-125-04)	**42,512**	**42,512**	**42,512**
Construction (04-D-125-04)			
Prior Years - FY 2018	282,289	241,682	228,937
FY 2019	98,929	78,579	76,195
FY 2020	23,747	84,688	48,846
FY 2021	4,040	4,056	12,169
FY 2022[a]	-41,316	-41,316	1,442
FY 2023	0	0	100
FY 2024	0	0	0
Total Construction (04-D-125-04)	**367,689**	**367,689**	**367,689**
TEC (04-D-125-04)			
Prior Years - FY 2018	324,468	283,861	271,116
FY 2019	99,262	78,912	76,528
FY 2020	23,747	84,688	48,846
FY 2021	4,040	4,056	12,169
FY 2022	-41,316	-41,316	1,442
FY 2023	0	0	100
FY 2024	0	0	0
Total TEC (04-D-125-04)	**410,201**	**410,201**	**410,201**
Other Project Costs (OPC)			
OPC except D&D (04-D-125-04)			
Prior Years - FY 2018	49,462	45,663	23417
FY 2019	46,652	40,000	13067
FY 2020	11,628	21,898	29951
FY 2021	0	181	34756
FY 2022	-4,399	-4,399	1952
FY 2023			200
FY 2024	0	0	0
Total OPC except D&D (04-D-125-04)	**103,343**	**103,343**	**103,343**

[a] Funding was reallocated from REI2 TEC Construction to remaining subprojects.

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Project Costs (TPC)			
Prior Years - FY 2018	373,930	329,524	294,533
FY 2019	145,914	118,912	89,595
FY 2020	35,375	106,586	78,797
FY 2021	4,040	4,237	46,925
FY 2022	-45,715	-45,715	3,394
FY 2023	0	0	300
FY 2024	0	0	0
Total TPC (04-D-125-04)[a]	**513,544**	**513,544**	**513,544**

[a]Prior year appropriation was reduced and applied to other project cost to support the final turnover to operations activities.

PF-4 Equipment Installation Phase 1 (PEI1) Subproject (04-D-125-05)[a]

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (04-D-125-05)			
Prior Years - FY 2018	31,611	31,611	31,611
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
Total Design (04-D-125-05)	**31,611**	**31,611**	**31,611**
Construction (04-D-125-05)			
Prior Years - FY 2018	157,704	156,435	110,245
FY 2019	42,085	43,354	53,745
FY 2020	0	0	21,395
FY 2021	0	0	3,205
FY 2022	-10,681	-10,681	518
FY 2023	0	0	0
FY 2024	0	0	0
Total Construction (04-D-125-05)[a]	**189,108**	**189,108**	**189,108**
TEC (04-D-125-05)			
Prior Years - FY 2018	189,315	188,046	141,856
FY 2019	42,085	43,354	53,745
FY 2020	0	0	21,395
FY 2021	0	0	3,205
FY 2022	-10,681	-10,681	518
FY 2023	0	0	0
FY 2024	0	0	0
Total TEC (04-D-125-05)	**220,719**	**220,719**	**220,719**
Other Project Costs (OPC)			
OPC except D&D (04-D-125-05)			
Prior Years - FY 2018	37,292	35,505	24,678
FY 2019	18,656	12,961	15,830
FY 2020	0	7,482	15,440
FY 2021	457	457	457
FY 2022	49	49	49
FY 2023			0
FY 2024	0	0	0
Total OPC except D&D (04-D-125-05)	**56,454**	**56,454**	**56,454**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Project Costs (TPC)			
Prior Years - FY 2018	226,607	223,551	166,534
FY 2019	60,741	56,315	69,575
FY 2020	0	7,482	36,835
FY 2021	457	457	3,662
FY 2022	-10,632	-10,632	567
FY 2023	0	0	0
FY 2024	0	0	0
Total TPC (04-D-125-05)	**277,173**	**277,173**	**277,173**

[a] Funding was reallocated from PEI1 to remaining subprojects.

PF-4 Equipment Installation Phase 2 (PEI2) Subproject (04-D-125-06)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (04-D-125-06)			
Prior Years - FY 2018	16,915	16,915	14,991
FY 2019	13,187	13,187	1,595
FY 2020	84,788	84,788	825
FY 2021	9,921	9,921	19,132
FY 2022	0	0	64,493
FY 2023	4,329	4,329	28,104
FY 2024	0	0	0
Total Design (04-D-125-06)	**129,140**	**129,140**	**129,140**
Construction (04-D-125-06)			
Prior Years - FY 2018	21,748	21,748	21,241
FY 2019	0	0	-1,611
FY 2020	43,508	43,508	0
FY 2021	85,384	85,384	3,875
FY 2022	111,339	111,339	19,766
FY 2023	95,671	95,671	78,687
FY 2024	115,443	115,443	119,680
FY 2025	23,460	23,460	157,067
FY 2026	0	0	85,884
FY 2027	0	0	11,964
FY 2028	0	0	0
FY 2029	0	0	0
Total Construction (04-D-125-06)	**496,553**	**496,553**	**496,553**
TEC (04-D-125-06)			
Prior Years - FY 2018	38,663	38,663	36,232
FY 2019	13,187	13,187	-16
FY 2020	128,296	128,296	825
FY 2021	95,305	95,305	23,007
FY 2022	111,339	111,339	84,259
FY 2023	100,000	100,000	106,791
FY 2024	115,443	115,443	119,680
FY 2025	23,460	23,460	157,067
FY 2026	0	0	85,884
FY 2027	0	0	11,964
FY 2028	0	0	0
FY 2029	0	0	0
Total TEC (04-D-125-06)	**625,693**	**625,693**	**625,693**

($K)	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
OPC non capital (04-D-125-06)			
Prior Years - FY 2018	296	296	296
FY 2019	6,142	6,142	1,480
FY 2020	0	0	503
FY 2021	0	0	650
FY 2022	0	0	86
FY 2023	0	0	3,423
Total OPC non capital (04-D-125-06)	**6,438**	**6,438**	**6,438**
OPC except D&D (04-D-125-06)			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	14,793	14,793	32
FY 2022	19,149	19,149	21
FY 2023			0
FY 2024	41,248	41,248	1,680
FY 2025	27,642	27,642	420
FY 2026	9,086	9,086	3,045
FY 2027	0	0	52,122
FY 2028	0	0	38,951
FY 2029	0	0	15,647
Total OPC except D&D (04-D-125-06)	**111,918**	**111,918**	**111,918**
OPC D&D (04-D-125-06)			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
Total OPC D&D (04-D-125-06)	**0**	**0**	**0**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total OPC (04-D-125-06)			
Prior Years - FY 2018	296	296	296
FY 2019	6,142	6,142	1,480
FY 2020	0	0	503
FY 2021	14,793	14,793	682
FY 2022	19,149	19,149	107
FY 2023	0	0	3,423
FY 2024	41,248	41,248	1,680
FY 2025	27,642	27,642	420
FY 2026	9,086	9,086	3,045
FY 2027	0	0	52,122
FY 2028	0	0	38,951
FY 2029	0	0	15,647
Total OPC (04-D-125-06)	**118,356**	**118,356**	**118,356**
Total Project Costs (TPC)			
Prior Years - FY 2018	38,959	38,959	36,528
FY 2019	19,329	19,329	1,464
FY 2020	128,296	128,296	1,328
FY 2021	110,098	110,098	23,689
FY 2022	130,488	130,488	84,366
FY 2023	100,000	100,000	110,214
FY 2024	156,691	156,691	121,360
FY 2025	51,102	51,102	157,487
FY 2026	9,086	9,086	88,929
FY 2027	0	0	64,086
FY 2028	0	0	38,951
FY 2029	0	0	15,647
Total TPC (04-D-125-06)	**744,049**	**744,049**	**744,049**

RLUOB Hazard Category 3 (RC3) (04-D-125-07)

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (04-D-125-07)			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	4,773	4,773	0
FY 2021	15,748	15,748	5,285
FY 2022	26,636	26,636	11,347
FY 2023	30,430	30,430	60,955
FY 2024	37,061	37,061	37,061
FY 2025	0	0	0
Total Design (04-D-125-07)	**114,648**	**114,648**	**114,648**
Construction (04-D-125-07)			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	24,992	24,992	0
FY 2023	7,693	7,693	0
FY 2024	8,011	8,011	22,000
FY 2025	1,540	1,540	20,236
FY 2026	0	0	0
FY 2027	0	0	0
Total Construction (04-D-125-07)	**42,236**	**42,236**	**42,236**
TEC (04-D-125-07)			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	4,773	4,773	0
FY 2021	15,748	15,748	5,285
FY 2022	51,628	51,628	11,347
FY 2023	38,123	38,123	60,955
FY 2024	45,072	45,072	59,061
FY 2025	1,540	1,540	20,236
FY 2026	0	0	0
FY 2027	0	0	0
Total TEC (04-D-125-07)	**156,884**	**156,884**	**156,884**
Other Project Costs (OPC)			
OPC non capital (04-D-125-07)			
Prior Years - FY 2018	162	162	162
FY 2019	6,035	6,035	838
FY 2020	4,787	2,510	4,126
FY 2021	0	2,277	5,858
FY 2022	0	0	-7
FY 2023	0	0	7
FY 2024	0	0	0
Total OPC non capital (04-D-125-07)	**10,984**	**10,984**	**10,984**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
OPC except D&D (04-D-125-07)			
Prior Years - FY 2018	1,000	1,000	324
FY 2019[a]	100	100	542
FY 2020	0	181	415
FY 2021	39,084	38,903	12,301
FY 2022	12,354	12,354	12,541
FY 2023	0	0	0
FY 2024	25,359	25,359	0
FY 2025	24,358	24,358	0
FY 2026	12,118	12,118	29,328
FY 2027	0	0	40,728
FY 2028	0	0	18,194
Total OPC except D&D (04-D-125-07)	**114,373**	**114,373**	**114,373**
Total OPC (04-D-125-07)			
Prior Years - FY 2018	1,162	1,162	486
FY 2019	6,135	6,135	1,380
FY 2020	4,787	2,691	4,541
FY 2021	39,084	41,180	18,159
FY 2022	12,354	12,354	12,534
FY 2023	0	0	7
FY 2024	25,359	25,359	0
FY 2025	24,358	24,358	0
FY 2026	12,118	12,118	29,328
FY 2027	0	0	40,728
FY 2028	0	0	18,194
Total OPC (04-D-125-07)	**125,357**	**125,357**	**125,357**
Total Project Costs (TPC)			
Prior Years - FY 2018	1,162	1,162	486
FY 2019	6,135	6,135	1,380
FY 2020	9,560	7,464	4,541
FY 2021	54,832	56,928	23,444
FY 2022	63,982	63,982	23,881
FY 2023	38,123	38,123	60,962
FY 2024	70,431	70,431	59,061
FY 2025	25,898	25,898	20,236
FY 2026	12,118	12,118	29,328
FY 2027	0	0	40,728
FY 2028	0	0	18,194
Total TPC (04-D-125-07)	**282,241**	**282,241**	**282,241**

Total Project

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (03-D-103-010)			
Prior Years - FY 2018	63,573	63,573	63,573
Total Design (03-D-103-010)	**63,573**	**63,573**	**63,573**
Design (04-D-125)			
Prior Years - FY 2018	477,634	477,634	475,710
FY 2019	13,520	13,520	1,928
FY 2020	89,561	89,561	825
FY 2021	25,669	25,669	24,417
FY 2022	26,636	26,636	75,840
FY 2023	34,759	34,759	89,059
FY 2024	37,061	37,061	37,061
FY 2025	0	0	0
Total Design (04-D-125)	**704,840**	**704,840**	**704,840**
Construction			
Prior Years - FY 2018	757,824	715,948	656,506
FY 2019	141,014	121,933	128,329
FY 2020	67,255	128,196	70,241
FY 2021	89,424	89,440	19,249
FY 2022	84,334	84,334	21,726
FY 2023	103,364	103,364	78,787
FY 2024	123,454	123,454	141,680
FY 2025	25,000	25,000	177,303
FY 2026	0	0	85,884
FY 2027	0	0	11,964
FY 2028	0	0	0
FY 2029	0	0	0
Total Construction	**1,391,669**	**1,391,669**	**1,391,669**

[a] Correction to FY 2019 OPC funding from prior year, funding was had been overstated between the OPC except D&D and the OPC non-capital funding categories.

($K)

	Budget Authority (Appropriations)	Obligations	Costs
TEC			
Prior Years - FY 2018	1,299,031	1,257,155	1,195,789
FY 2019	154,534	135,453	130,257
FY 2020	156,816	217,757	71,066
FY 2021	115,093	115,109	43,666
FY 2022	110,970	110,970	97,566
FY 2023	138,123	138,123	167,846
FY 2024	160,515	160,515	178,741
FY 2025	25,000	25,000	177,303
FY 2026	0	0	85,884
FY 2027	0	0	11,964
FY 2028	0	0	0
FY 2029	0	0	0
Total TEC	**2,160,082**	**2,160,082**	**2,160,082**
Other Project Costs (OPC)			
(OPC non capital)			
Prior Years - FY 2018	89,179	89,179	89,179
FY 2019	12,177	12,177	2,318
FY 2020	4,787	2,510	4,629
FY 2021	0	2,277	6,508
FY 2022	0	0	79
FY 2023	0	0	3,430
FY 2024	0	0	0
Total OPC non capital	**106,143**	**106,143**	**106,143**
(OPC except D&D)			
Prior Years - FY 2018	87,754	82,168	48,419
FY 2019[a]	65,408	53,061	29,439
FY 2020	11,628	29,561	45,806
FY 2021	54,334	54,334	47,546
FY 2022	27,153	27,153	14,563
FY 2023	0	0	200
FY 2024	66,607	66,607	1,680

[a] Correction to FY 2019 OPC funding from prior year, funding had been overstated between the OPC except D&D and the OPC non-capital funding categories.

($K)

	Budget Authority (Appropriations)	Obligations	Costs
FY 2025	52,000	52,000	420
FY 2026	21,204	21,204	32,373
FY 2027	0	0	92,850
FY 2028	0	0	57,145
FY 2029	0	0	15,647
Total OPC except D&D	**386,088**	**386,088**	**386,088**
OPC D&D			
Prior Years - FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
FY 2028	0	0	0
FY 2029	0	0	0
Total OPC D&D	**0**	**0**	**0**
OPC Total			
Prior Years - FY 2018	176,933	171,347	137,598
FY 2019	77,585	65,238	31,757
FY 2020	16,415	32,071	50,435
FY 2021	54,334	56,611	54,054
FY 2022	27,153	27,153	14,642
FY 2023	0	0	3,630
FY 2024	66,607	66,607	1,680
FY 2025	52,000	52,000	420
FY 2026	21,204	21,204	32,373
FY 2027	0	0	92,850
FY 2028	0	0	57,145
FY 2029	0	0	15,647
Total, OPC	**492,231**	**492,231**	**492,231**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Project Costs (TPC)			
Prior Years - FY 2018	1,475,964	1,428,502	1,333,387
FY 2019	232,119	200,691	162,014
FY 2020	173,231	249,828	121,501
FY 2021	169,427	171,720	97,720
FY 2022	138,123	138,123	112,208
FY 2023	138,123	138,123	171,476
FY 2024	227,122	227,122	180,421
FY 2025	77,000	77,000	177,723
FY 2026	21,204	21,204	118,257
FY 2027	0	0	104,814
FY 2028	0	0	57,145
FY 2029	0	0	15,647
Total TPC[a]	**2,652,313**	**2,652,313**	**2,652,313**

[a] The FY 2024 Budget Request assumes a TPC for RC3 of $282 million, which NNSA currently assesses will meet the project's mission need. NNSA will complete the planning for the prioritized scope for CMRR during FY 2023, and revise outyear funding requirements as necessary.

4. Details of Project Cost Estimate

Prior Subprojects (RLUOB/REI/Nuclear Facility) 03-D-103-010 & 04-D-125-01, -02, -03)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design			
Contingency			
Total Design	**450,502**	**450,502**	**450,502**
Construction			
Site Work			
Equipment			
Construction			
Contingency			
Total Construction	**296,083**	**296,083**	**N/A**
Total Estimated Cost (TEC)	**746,585**	**746,585**	**N/A**
Contingency, TEC			
Other Project Costs (OPC)			
OPC except D&D			
R&D			N/A
Conceptual Planning			N/A
Conceptual Design			N/A
Other OPC Costs			N/A
Contingency			N/A
Total OPC	**88,721**	**88,721**	**N/A**
Contingency, OPC			
Total Project Cost	**835,306**	**835,306**	**N/A**
Total Contingency (TEC+OPC)	**0**	**0**	**N/A**

REI Phase 2 (REI2) Subproject (04-D-125-04)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	42,512	42,512	N/A
Contingency			N/A
Total Design	**42,512**	**42,512**	**44,816**
Construction			
Site Work	4,463	4,463	5,461
Equipment	42,750	42,750	52,089
Construction	320,476	320,934	305,023
Contingency	0	0	80,651
Total Construction	**367,689**	**368,147**	**443,224**
Total Estimated Cost (TEC)	**410,201**	**410,659**	**488,040**
Contingency, TEC	*0*	*0*	*80,651*
Other Project Costs (OPC)			
OPC except D&D			
R&D			
Conceptual Planning	2,595	2,595	1,883
Conceptual Design	3,670	3,670	2,663
Other OPC Costs	97,078	99,926	81,707
Contingency	0	0	59,594
Total OPC	**103,343**	**106,191**	**145,847**
Contingency, OPC	0	0	59,594
Total Project Cost[ab]	**513,544**	**516,850**	**633,887**
Total Contingency (TEC+OPC)	**0**	**0**	**140,245**

[a] Funding was reallocated from REI2 TEC Construction to remaining subprojects.

[b] REI2 achieved CD-4, with an approved TPC of $509,300,000. The subproject is currently in final costs closeout and this number will be updated to reflect the final TPC value after closeout is completed. The tables reflect the current cost to date of $513,244,000.

PF-4 Equipment Installation Phase 1 (PEI1) Subproject (04-D-125-05)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	31,611	31,611	N/A
Contingency			N/A
Total Design	**31,611**	**31,611**	**34,308**
Construction			
Site Work	30,054	30,054	43,054
Equipment	11,842	11,842	11,842
Construction	147,212	147,194	137,892
Contingency			65,204
Total Construction	**189,108**	**189,090**	**257,992**
Total Estimated Cost (TEC)	**220,719**	**220,701**	**292,300**
Contingency, TEC	*0*	*0*	*65,204*
Other Project Costs (OPC)			
OPC except D&D			
R&D			
Conceptual Planning	2,189	2,189	2,189
Conceptual Design	0	0	0
Other OPC Costs	54,265	54,716	63,686
Contingency	0	0	35,825
Total OPC	**56,454**	**56,905**	**101,700**
Contingency, OPC	0	0	35,825
Total Project Cost[ab]	**277,173**	**277,606**	**394,000**
Total Contingency (TEC+OPC)	**0**	**0**	**101,029**

[a] Funding was reallocated from PEI1 to remaining subprojects.

[b] The CD-4 TPC value was approved at $284,000,000. The project is currently in financial closeout and final TPC will be updated to reflect the final TPC when this process is complete. The tables reflect the current cost to date of $277,173,000.

PF-4 Equipment Installation Phase 2 (PEI2) Subproject (04-D-125-06)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	79,501	79,501	N/A
Contingency	49,639	49,639	N/A
Total Design	**129,140**	**129,140**	**N/A**
Construction			
Site Work	700	700	N/A
Equipment	118,000	118,000	N/A
Construction	342,653	307,373	N/A
Contingency	35,200	35,200	N/A
Total Construction	**496,553**	**461,273**	**N/A**
Other TEC (if any)			
Cold Startup	0	0	N/A
Contingency	0	0	N/A
Total, Other TEC	**0**	**0**	**N/A**
Total Estimated Cost (TEC)	**625,693**	**590,413**	**N/A**
Contingency, TEC	*84,839*	*84,839*	*N/A*
Other Project Costs (OPC)			
OPC D&D			
OPC D&D	0	35,280	N/A
OPC except D&D			
R&D	0	0	N/A
Conceptual Planning	0	0	N/A
Conceptual Design	0	0	N/A
Other OPC Costs	98,630	98,630	N/A
Contingency	19,726	19,726	N/A
Total OPC	**118,356**	**153,636**	**N/A**
Contingency, OPC	*19,726*	*19,726*	*N/A*
Total Project Cost[a]	**744,049**	**744,049**	**N/A**
Total Contingency (TEC+OPC)	***104,565***	***104,565***	***N/A***

[a] The high end of the current cost range the subproject was increased to reflect the completion of PEI1and REI2 subprojects and application of the underruns to the existing scope. The underruns are being used/made available to address existing scope as performance baselines are established. Until a performance baseline for all scope elements of the project is achieved, the project will maintain the top end of the range established at CD-1.

RLUOB Hazard Category 3 (RC3) (04-D-125-07)

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	69,499	69,499	N/A
Contingency	45,149	45,149	N/A
Total Design	**114,648**	**114,648**	**N/A**
Construction			
Site Work	900	900	N/A
Equipment/Construction	245,467	245,467	N/A
Other, as needed	0	0	N/A
Contingency	*29,786*	*27,847*	*N/A*
Total Construction	**276,153**	**274,214**	**N/A**
Other TEC (if any)			
Cold Startup	0	0	N/A
Contingency	0	0	N/A
Total, Other TEC	**0**	**0**	**N/A**
Total Estimated Cost (TEC)	**390,801**	**388,862**	**N/A**
Contingency, TEC	*74,935*	*72,996*	*N/A*
Other Project Costs (OPC)			
OPC except D&D			
R&D	0	0	N/A
Conceptual Planning	0	0	N/A
Conceptual Design	0	0	N/A
Other OPC Costs	82,452	82,452	N/A
Contingency	42,905	41,105	N/A
Total OPC	**125,357**	**123,557**	**N/A**
Contingency, OPC	***42,905***	***41,105***	***N/A***
Total Project Cost[a]	**516,158**	**512,419**	**N/A**
Total Contingency (TEC+OPC)	***117,840***	***114,101***	***N/A***

[a] Reflect the Top of Range value.

Total Project

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design			N/A
Contingency			N/A
Total Design	**768,413**	**768,413**	**N/A**
Construction			
Site Work			N/A
Equipment			N/A
Construction			N/A
Contingency			N/A
Total Construction	**1,625,586**	**1,588,807**	**N/A**
Other TEC (if any)			
Cold Startup	0	0	N/A
Contingency	0	0	N/A
Total, Other TEC	**0**	**0**	**N/A**
Total Estimated Cost (TEC)	**2,393,999**	**2,357,220**	**N/A**
Contingency, TEC	*159,774*	*157,835* [a]	*N/A*
Other Project Costs (OPC)			
OPC D&D			
OPC D&D	0[b]	35,280	N/A
OPC except D&D	492,231	493,730	
Total OPC	**492,231**	**529,010**	**N/A**
Contingency, OPC	62,631	60,831	N/A
Total Project Cost	**2,886,230**	**2,886,230** [b]	**N/A**
Total Contingency (TEC+OPC)	**222,405**	**218,666** [a]	**N/A**

[a] The TEC contingency in the FY 2023 Congressional Budget Justification was understated by $52 thousand in the Details of Project Cost Summary Total Project. The number has been updated to reflect the correction of the contingency values.

[b] The high end of the current cost range of the subproject was increased to reflect the completion of PEI1and REI2 subprojects and application of the underruns to the existing scope. The underruns are being used/made available to address existing scope as performance baselines are established. Until a performance baseline for all scope elements of the project is achieved, the project will maintain the top end of the range established at CD-1.

5. Schedule of Appropriations Requests[a]

($K)

Request Yea	Type	Prior Years	FY2021	FY2022	FY2023	FY 2024	FY 2025	FY2026	FY2027	FY2028	Total
FY 2018	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,955,230	274,000	289,000	0	0	0	0	0	359,000	2,877,230
FY 2019	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,954,230	274,006	285,000	0	0	0	0	0	363,994	2,877,230
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,851,936	39,817	0	0	0	0	0	0	0	1,891,753
FY 2021	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,870,503	169,427	238,123	113,655	275,841	198,477	11,204	0	0	2,877,230
FY 2022	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,889,937	169,427	138,123	0	0	0	0	0	688,743	2,886,230
FY 2023	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,892,214	169,427	138,123	162,012	248,917	167,867	0	0	0	2,778,560
FY 2024	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	TPC	1,881,314	169,427	138,123	138,123	227,122	77,000	21,204	0	0	2,652,313

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy[b]	2Q FY 2023
Expected Useful Life	50 years
Expected Future Start of D&D of this capital asset	2Q FY 2073

Related Funding Requirements

(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	25	25	1,250	1,250

[a] The FY 2024 Budget Request assumes a TPC for RC3 of $282 million, which NNSA currently assesses will meet the project's mission need. NNSA will complete the planning for the prioritized scope for CMRR during FY 2023, and revise outyear funding requirements as necessary.

[b] Start date tied to anticipated programmatic operation of RLUOB as a hazard category 3 facility. Individual portions of CMRR project will have different completion dates and life spans.

7. D&D Information

The scope parameters established at CD-1 provided necessary Site Infrastructure Improvements (office facilities, physical security, warehouse, material staging and laydown area, access control and change rooms, etc.) to support AC/MC mission relocation, and to enable increased construction capacity, risk mitigation, and project efficiency. These activities will include an increase in site square footage and the D&D of equipment within existing facilities. The D&D of existing facilities is not funded on this project.

CMR D&D is not part of the CMRR project scope. Some removal of contaminated equipment in PF-4 for space reuse will occur using project funds.

Gross Square Footage Created/Eliminated	RLUOB/ REI1 Square Feet	REI2/PEI1 Square Feet	RC3/PEI2 Square Feet
New area constructed previously by this project at Los Alamos National Laboratory……………………………………………………………………	225,757	50,000	127,500
Area of D&D in this project at Los Alamos National Laboratory ………..	0	0	0
Area at Los Alamos National Laboratory to be transferred, sold, and/or D&D outside the project including area previously "banked"………………………………………………………………………………………	225,757	50,000	127,500
Area of D&D in this project at other sites ………………………………………	0	0	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously "banked"………………………………………………………………………………………	0	0	0
Total area eliminated …………………………………………………………………….	0	0	0

8. Acquisition Approach

The CMRR Acquisition Strategy is based on procurement strategies specific for each subproject of the CMRR project in order to mitigate overall technical and schedule risk. The RLUOB subproject was executed via LANL-issued design-build subcontract based on performance specifications developed during CMRR Conceptual Design. The REI1 subproject was executed via LANL-issued final design-bid build construction contracts. The REI2 subproject is being executed via LANL-issued final design-bid-build construction contracts. The PEI1 subproject was executed via LANL-issued final design, and the construction was self-performed in the PF-4. The PEI2 subproject will be executed via LANL-issued design subcontracts, and construction will be self-performed in the PF-4. Construction work external to PF-4 will be executed through construction subcontracts. The RC3 subproject will be executed via LANL-issued design subcontracts, and construction will be self-performed in RLUOB. Construction external to RLUOB will be executed through design/build subcontracts. The performance baselines for each baselined subproject have been/will be established upon completion of 90% design maturity to allow development of credible cost estimates in accordance with DOE O 413.3B and NNSA policy.

22-D-513 Power Sources Capability (PSC) Facility
Sandia National Laboratories, Albuquerque, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the Power Sources Capability (PSC) is $37,886,000. The FY 2024 Request completes funding for design and supports award of long lead equipment procurements and subcontracts for early site preparation work. This CPDS has been revised following approval of the Critical Decision-1 (CD-1) cost range in accordance with DOE Order 413.3B.

Significant Changes:
This Construction Project Data Sheet (CPDS) is an update of the Fiscal Year (FY) 2022 CPDS and does not include a new start for the budget year. A CPDS was not submitted for FY 2023 due to the need to optimize the conceptual design to reduce unnecessary scope before seeking CD-1 approval. The ROM cost range for the project at CD-0 was $80,000,000 to $320,000,000. NNSA investigated and found cost savings opportunities via a value engineering (VE) study. CD-1 was approved on December 29, 2022, and utilizes a more efficient facility layout that incorporates some of those VE ideas which will be further developed during preliminary and final design. The most recent DOE O 413.3B approved Critical Decision is CD-1, *Approve Alternative Selection and Cost Range,* which was approved on December 29, 2022, with a cost range of $344,000,000 to $400,000,000 and a CD-4 date of 3Q FY 2030.

The Conceptual Design for the facility was completed July 14, 2021, which was followed by an independent project review (IPR) in September 2021 with the goal of achieving CD-1 approval by 1Q FY 2022. Pursuit of CD-1 approval was suspended while value engineering was conducted, and options were developed to reduce facility cost. Using a new architect engineer company, the project developed a new facility layout option which reduces project building size by approximately 31,000 square feet to 135,000 square feet. This was achieved by using more appropriately sized laboratory hallways, reduction in oversized office and laboratory space and by developing a more architecturally efficient design while still meeting program requirements. At CD-1 approval NNSA established a top-end of the range limit of $400M for the project funding. The CD-1 top-end range estimate included contemporary escalation rates and a new requirement for zero emissions which is addressed in the design.

A Federal Project Director has been assigned to this project and approved this CPDS.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2022	07/10/2019	4Q FY 2021	1Q FY 2022	4Q FY 2023	1Q FY 2023	4Q FY 2023	N/A	4Q FY 2026
FY 2024	07/10/2019	07/14/2021	12/29/2022	3Q FY 2025	3Q FY 2025	3Q FY 2025	N/A	3Q FY 2030

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Estimated date the conceptual design will be completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction
D&D Complete – N/A
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Year	CD-3A/3B[a]
FY 2024	2Q FY 2024

CD-3A – Approve Long lead procurement
CD-3B – Approve site preparation

Project Cost History ($K)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2022	27,000	261,000	288,000	32,000	N/A	32,000	320,000
FY 2024	22,379	353,574	375,953	24,047	N/A	24,047	400,000

2. Project Scope and Justification

Scope

The PSC facility will be a new, Leadership in Energy and Environmental Design (LEED) Certified, modern building with co-located offices and operations.

The PSC facility will consist of approximately 135,000 gross square feet of offices, laboratories, and support areas. The scope of the project remains unchanged; the facility size has been reduced by 31,000 square feet and optimized to still meet all the requirements through value engineering. The size of the facility will be refined throughout the established design process.

The new PSC facility will include the following high-level capabilities:

- A 50-year operating life
- Collocated office, general use, and specialized laboratory space in one facility
- Operational and physical security controls for all space types
- Lab area infrastructure to support local exhaust ventilation, grounding and static dissipative controls, and specific engineering controls for operations
- Controls and requirements for the varying chemicals throughout the facility, which include water reactive materials, compressed gasses (inert, oxygen, inert/5% hydrogen, etc.)
- Expanded utilities and site infrastructure to enable future building addition
- LEED certification and compliance with Climate Adaptation, Resilience and Sustainability in Project Management memorandum from The Deputy Secretary of Energy issued April 5, 2022.

CD-3A, Approve Long-Lead Procurement will be used for laboratory and facility equipment ($17 million). This equipment has long procurement durations on the order of 18 to 24 months. The process equipment includes dryers to remove moisture from the ambient air to provide a dry, low dew point atmosphere within the facility for the safe handling of water-reactive materials during production and research. Other process equipment includes a sputter coater, an electron beam welder, a shock tower, a vibration table, and a semi-automated pellet press. CD-3B, Site preparation ($6 million) will advance early site work in advance of vertical construction, and consists of grading, clearing, and grubbing, installation of drainage and erosion control for the construction area, and temporary utilities for general contractor trailers.

Justification

When Sandia National Laboratories (SNL) began supporting the power source production mission, no facility specifically designed to carry out the mission existed at SNL. The power source production mission was carried out in Building 894, a now 71-year-old shipping and receiving facility not designed to handle the environments necessary for the mission. The building's maintenance issues began impeding operations at an increasing rate by 2016, thus putting production capacities

[a] CD-3A, Approve Long-Lead Procurement will be used for laboratory and facility equipment. CD-3B Site preparation will be used for early site work in advance of construction.

at significant risk. Building 894 was rated as “Poor” (Building Condition Index Score of 56) by facility and system assessments conducted in 2020. The facility has $26 million in deferred maintenance.

Successful completion of the power sources facility will:

- Enable the NNSA to meet power source requirements through 2080;
- Reduce risks to the programs associated with SNL Building 894, including environmental safety and health risks;
- Reduce the risk of mission dependence on an unstable vendor base;
- Ensure the availability of capabilities to complete RDT&E activities in addition to production; and,
- Ensure the flexibility and agility necessary to meet future mission needs.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets. Funds requested under this data sheet may be used to provide independent assessments for planning and execution of this project, and contracted support services to the federal project team for oversight and support.

Preliminary Key Performance Parameters (KPPs)

The Threshold KPPs, represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The Objective KPPs represent the desired project performance. Initial values were developed prior to CD-0 approval and were revised prior to CD-1.

#	Requirement	Threshold Value	Objective Value	Unit
M-1	Meet PRD requirements for primary batteries[a]	Various (see PRD)	Various (see PRD)	Starts and programs per year
M-2	Meet PRD requirements for thermal batteries	Various (see PRD)	Various (see PRD)	Starts and programs per year
M-3	Meet PRD requirements for RTG technology	Various (see PRD)	Various (see PRD)	Starts and programs per year

[a] Includes both starts for Joint Test Assemblies and Stockpiled Power Sources.

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2022	13,827	13,827	0
FY 2023	0	0	2,255
FY 2024	8,552	8,552	12,674
FY 2025	0	0	7,450
Total Design	**22,379**	**22,379**	**22,379**
Construction			
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	29,334	29,334	16,380
FY 2025	71,083	71,083	31,235
FY 2026	73,902	73,902	119,057
FY 2027	79,824	79,824	77,000
FY 2028	45,136	45,136	43,686
FY 2029	36,260	36,260	40,423
FY 2030	18,035	18,035	25,793
Total Construction	**353,574**	**353,574**	**353,574**
TEC			
FY 2022	13,827	13,827	0
FY 2023	0	0	2,255
FY 2024	37,886	37,886	29,054
FY 2025	71,083	71,083	38,685
FY 2026	73,902	73,902	119,057
FY 2027	79,824	79,824	77,000
FY 2028	45,136	45,136	43,686
FY 2029	36,260	36,260	40,423
FY 2030	18,035	18,035	25,793
Total TEC	**375,953**	**375,953**	**375,953**

($K)	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)			
FY 2020	3,000	3,000	790
FY 2021	4,675	4,675	5,551
FY 2022	6,352	6,352	4,346
FY 2023	0	0	1,700
FY 2024	1,000	1,000	1,480
FY 2025	2,000	2,000	2,200
FY 2026	1,361	1,361	1,361
FY 2027	1,788	1,788	1,788
FY 2028	2,421	2,421	2,000
FY 2029	1,450	1,450	1,700
FY 2030		0	1,131
Total, OPC	**24,047**	**24,047**	**24,047**
Total Project Costs (TPC)			
FY 2020	3,000	3,000	790
FY 2021	4,675	4,675	5,551
FY 2022	20,179	20,179	4,346
FY 2023	0	0	3,955
FY 2024	38,886	38,886	30,534
FY 2025	73,083	73,083	40,885
FY 2026	75,263	75,263	120,418
FY 2027	81,612	81,612	78,788
FY 2028	47,557	47,557	45,686
FY 2029	37,710	37,710	42,123
FY 2030	18,035	18,035	26,924
Total TPC	**400,000**	**400,000**	**400,000**

4. Details of Project Cost Estimate

($K)

	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	17,305	TBD	N/A[a]
Federal Design Review Support	1,665	TBD	
Contingency	3,409	TBD	
Total Design	**22,379**	**27,000**	**0**
Construction			
Site Work	33,077	TBD	
Equipment	50,887	TBD	
Construction	219,381	TBD	
Federal Support	2,171	TBD	
Contingency	48,058	TBD	
Total Construction	**353,574**	**261,000**	**0**
Total Estimated Cost (TEC)	**375,953**	**288,000**	**0**
Contingency, TEC	*51,467*	*TBD*	*0*
Other Project Costs (OPC)			
OPC except D&D			
Analysis of Alternatives	821	821	
Conceptual Design	9,616	3,300	
CD-1 Documents/Fed Support	1,762	5,100	
Start-up	1,400	TBD	
Equipment Move	8,060	TBD	
Contingency	2,388	TBD	
Total OPC	**24,047**	**32,000**	**0**
Contingency, OPC	*2,388*	*TBD*	*0*
Total Project Cost	**400,000**	**320,000**	**0**
Total Contingency (TEC+OPC)	***53,855***	***TBD***	***0***

[a] Project is pre-CD-2 and project baseline has not been established.

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2022	TEC	0	13,827	TBD	TBD	TBD	TBD	TBD	N/A	274,173	288,000
	OPC	9,000	800	TBD	TBD	TBD	TBD	TBD	N/A	22,200	32,000
	TPC	9,000	14,627	TBD	TBD	TBD	TBD	TBD	N/A	296,373	320,000
FY 2024	TEC	0	13,827	0	37,886	71,083	73,902	79,824	45,136	54,295	375,953
	OPC	7,675	6,352	0	1,000	2,000	1,361	1,788	1,450	2,421	24,047
	TPC	7,675	20,179	0	38,886	73,083	75,263	81,612	46,586	56,716	400,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	4Q FY 2030
Expected Useful Life (number of years)	50
Expected Future Start of D&D of this capital asset (fiscal quarter)	4Q FY 2080

	Annual Cost		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	$0.8M	$0.8M	$40M	$40M

7. D&D Information

The one-for-one offset requirement will be met by utilizing site-banked square footage. A plan for D&D of the existing facility will be developed at the end of construction of the new facility when characterization data is available

	Square Feet
New area being constructed by this project at SNL	135,000
Area of D&D in this project at SNL	0
Area at SNL to be transferred, sold, and/or D&D outside the project including area previously “banked”	135,000
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously “banked”	0
Total area eliminated	135,000

8. Acquisition Approach

The preliminary and final design is being led by the SNL Management and Operating contractor utilizing a subcontracted Architectural and Engineering firm. The Management and Operations Contractor will award a subcontract for the construction of the facility and will provide oversight of construction activities.

Stockpile Research, Technology, and Engineering

Overview
The Stockpile Research, Technology, and Engineering (SRT&E) program provides the knowledge and expertise needed to maintain confidence in the nuclear stockpile without additional nuclear explosive testing.

The subprograms are:
1. Assessment Science (AS)
2. Engineering and Integrated Assessments (EIA)
3. Inertial Confinement Fusion (ICF)
4. Advanced Simulation and Computing (ASC)
5. Weapon Technology and Manufacturing Maturation (WTMM)
6. Academic Programs (AP) - Starting in FY 2024, funding for this program is requested apart from SRT&E under the new Academic Programs and Community Support.

The Stockpile Research, Technology, and Engineering (SRT&E) program:
1. Provides the foundation for science-based stockpile decisions; the capabilities, tools, and components to enable assessment, qualification, certification, and technology maturation; and balances the most pressing investments needed to meet Department of Defense (DoD) warhead requirements and schedules, along with the critical long-term research and development needed for a robust and responsive future stockpile.
2. Pursues Critical Decision-4 in Fiscal Year (FY) 2030 for the Advanced Sources and Detectors (ASD) Major Item of Equipment (MIE) for the Enhanced Capabilities for Subcritical Experiments (ECSE) program.
3. Deploys the Advanced Simulation and Computing (ASC) Commodity Technology System-2 (CTS-2), Crossroads and El Capitan high performance computing (HPC) systems in the classified computing environment for annual assessment, modernization programs, and safety and surety assessments in FY 2024 and across the Future-Years Nuclear Security Program (FYNSP).
4. Delivers modern technologies to enhance secure manufacturing capabilities and provide timely support of the stockpile, such as increasing Technology (TRL) and Manufacturing Readiness Levels (MRL) with reduced systems costs.

Line-Item Construction and Major Items of Equipment
SRT&E line-item construction projects and line-item purchases are critical to revitalizing the SRT&E and program-specific capabilities that directly support the nuclear weapons programs. The FY 2024 Budget Request for the U1a Complex Enhancements Project (UCEP) is $126,570,000. UCEP will perform mining and provide the supporting structures, systems, and components necessary to deploy large Major Items of Equipment (MIE) diagnostic systems and experiments. The enhancements to the U1a Complex included in this line item will provide the drifts and the supporting structures, systems, and components necessary for deploying the MIEs to diagnose the subcritical hydrodynamic integral weapons experiments using plutonium. The FY 2024 Budget Request for the Advanced Sources and Detectors Major Item of Equipment is $279,601,000. The ASD MIE installs a linear induction accelerator into the U1a Complex. The ASD MIE will provide the capability to conduct weapons-scale, radiographically diagnosed subcritical experiments using special nuclear material. The Z-Pinch Experimental Underground System (Zeus) Test Bed Facility Improvements (ZTBFI) minor construction project (previously known as U1a.03 Test Bed Facility Improvements), constructs a new test bed that will allow dynamic Neutron Diagnosed Subcritical Experiments (NDSE) experiments. Originally slated for construction within existing U1a Complex tunnels, experimental requirements now dictate new tunnels. New tunnels will require the ZTBFI project to exceed the minor construction cost limit. The 24-D-513 ZTBFI project FY 2024 Budget Request is $80,000,000.

50 U.S. Code 2746 requires that if the estimated cost of completing conceptual design for a construction project exceeds $5,000,000 the Secretary shall submit to Congress a request for funds for the conceptual design before submitting a request for funds for the construction project. NNSA anticipates the estimated cost to complete the conceptual design for Los Alamos Neutron Science Center (LANSCE) Modernization Project (LAMP) construction project will be $16,000,000 to $31,000,000 and will be funded out of the Primary Assessment Technology program. Next Generation Pulsed Power Facility construction project estimated conceptual design costs are between $120,000,000 and $240,000,000 and will be funded out of the Inertial Confinement Fusion program.

Stockpile Research, Technology, and Engineering
Funding (Comparable)

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Stockpile Research, Technology, and Engineering					
Assessment Science					
Primary Assessment Technologies	150,000	154,507	160,634	+6,127	+4.0%
Dynamic Materials Properties	130,981	124,366	128,560	+4,194	+3.4%
Advanced Diagnostics	35,989	31,064	35,141	+4,077	+13.1%
Secondary Assessment Technologies	84,000	72,104	74,880	+2,776	+3.8%
Enhanced Capabilities for Subcritical Experiments	215,579	277,225	292,373	+15,148	+5.5%
Hydrodynamic and Subcritical Experiment Execution Support	152,845	142,402	146,163	+3,761	+2.6%
24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS	0	0	80,000	+80,000	0%
17-D-640, U1a, Complex Enhancements Project, NNSS	135,000	53,130	126,570	+73,440	+138.2%
Total, Assessmment Science	904,394	854,798	1,044,321	+189,523	+22.2%
Engineering and Integrated Assessments					
Archiving and Support	45,760	43,950	44,805	+855	+1.9%
Delivery Environments	39,235	37,674	38,388	+714	+1.9%
Weapons Survivability	59,500	93,303	88,368	-4,935	-5.3%
Studies and Assessments	0	5,000	79,924	+74,924	+1498.5%
Aging and Lifetimes	87,260	87,260	59,955	-27,305	-31.3%
Stockpile Responsiveness	50,000	63,742	69,882	+6,140	+9.6%
Advanced Certification and Qualification	60,330	58,104	59,134	+1,030	+1.8%
Total, Engineering and Integrated Assessments	342,085	389,033	440,456	+51,423	+13.2%
Inertial Confinement Fusion	580,000	630,000	601,650	-28,350	-4.5%
Advanced Simulation and Computing	747,012	790,000	782,472	-7,528	-1.0%
Weapon Technology and Manufacturing Maturation	292,630	286,165	327,745	+41,580	+14.5%
Total, Stockpile Research, Technology, and Engineering	2,866,121	2,949,996	3,196,644	+246,648	+8.4%

Stockpile Research, Technology, and Engineering
Outyear Funding (Comparable)

	FY 2025 Request ($K)	FY 2026 Request ($K)	FY 2027 Request ($K)	FY 2028 Request ($K)
Stockpile Research, Technology, and Engineering				
Assessment Science				
Primary Assessment Technologies	**269,296**	**350,436**	**345,838**	**303,975**
Dynamic Materials Properties	**160,982**	**185,743**	**159,562**	**163,515**
Advanced Diagnostics	**36,500**	**33,210**	**33,907**	**34,143**
Secondary Assessment Technologies	**76,581**	**78,273**	**79,917**	**80,473**
Enhanced Capabilities for Subcritial Experiments	**366,798**	**231,718**	**113,156**	**113,926**
Hydrodynamic and Subcritical Experiment Execution Support	**182,173**	**181,963**	**165,413**	**166,761**
17-D-640, U1a, Complex Enhancements Project, NNSS	**33,083**	**0**	**0**	**0**
Total, Assessmment Science	**1,125,413**	**1,061,343**	**897,793**	**862,793**
Engineering and Integrated Assessments				
Archiving and Support	**44,875**	**44,819**	**45,874**	**46,227**
Delivery Environments	**38,447**	**38,397**	**39,208**	**39,481**
Weapons Survivability	**97,002**	**98,248**	**93,434**	**65,736**
Studies and Assessments	**85,000**	**125,000**	**85,000**	**85,000**
Aging and Lifetimes	**60,072**	**59,966**	**61,242**	**61,639**
Stockpile Responsiveness	**70,000**	**70,000**	**71,470**	**71,967**
Advanced Certification and Qualification	**59,229**	**59,160**	**60,417**	**60,837**
27-D-XXX, Combined Radiation Effects Survivability Testing, SNL	**0**	**0**	**150,000**	**200,000**
Total, Engineering and Integrated Assessments	**454,625**	**495,590**	**606,645**	**630,887**
Inertial Confinement Fusion	**688,581**	**708,519**	**749,151**	**729,307**
Advanced Simulation and Computing	**863,795**	**880,795**	**884,415**	**894,765**
Weapon Technology and Manufacturing Maturation	**361,489**	**331,379**	**316,707**	**318,736**
Total, Stockpile Research, Technology, and Engineering	**3,493,903**	**3,477,626**	**3,454,711**	**3,436,488**

Stockpile Research, Technology, and Engineering
Funding (Non-Comparable)

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Stockpile Research, Technology, and Engineering					
Academic Programs	**111,912**	**119,012**	**0**	**-119,012**	**-100.0%**
Total, Academic Programs and Community Support	**111,912**	**119,012**	**152,271**	**+33,259**	**+27.9%**

Stockpile Research, Technology, and Engineering
Funding (Non-Comparable)

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Academic Programs and Community Support	**172,764**	**193,860**	**194,863**	**202,426**

($K)

Proposed FY 2024 Budget Structure

Academic Programs and Community Support[a]

(Reporting Levels under Academia, Pipeline, and Workforce)

	Stewardship Science Academic Alliance (SSAA)	Minority Serving Institution Partnership Program (MSIPP)	Tribal Education Partnershiip Program (TEPP)	Joint Program in High Energy Density Laboratory Plasmas (HEDLP)	Computational Science Graduate Fellowships (CSGF)	Predictive Science Academic Alliance Program (PSAPP)	Pipeline Development (PD)	Community Capacity Building Program	Total
FY 2023 Budget Structure									
Weapons Activities									
Stockpile Research, Technology, and Engineering									
Academic Programs	26,029	45,000	10,000	10,412	2,000	21,830	7,000	30,000	152,271
Total	**26,029**	**45,000**	**10,000**	**10,412**	**2,000**	**21,830**	**7,000**	**30,000**	**152,271**

[a] This is the proposed Control Level.

Stockpile Research, Technology, and Engineering
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Stockpile Research, Technology, and Engineering	
Assessment Science: The increase provides initial support of efforts for LAMP, while funding experiments focused on design and production requirements for validation of modernization weapons design and funding the National Plutonium Aging Strategy and maintains support to mission-critical activities at JASPER, NIF, TA-55 gas gun, and requisite plutonium shots on Z. Also funds additional investment in key diagnostic and pulsed power driver activities. Funds priority experimental platform and materials development activities, procurements for the Advanced Sources and Detectors (ASD-Scorpius) project, and supports current firing sites at LANL, LLNL, and NNSS. Fully funds the estimated remainder of the ZTBFI project.	**+189,523**
Engineering and Integrated Assessments (E&IA): The increase reflects programmatic growth in the Aging and Lifetimes, Archiving and Support, Delivery Environments, Studies and Assessments (S&A), Advanced Certification and Qualification (ACQ), and the Stockpile Responsiveness Program (SRP). The increase reflects the growing reliance on the SRP to deliver needed capabilities such as commercial flight capabilities for demonstrators and exercising transformative approaches to communicating design information within the enterprise. Future programs rely on the innovation afforded SRP through prototype development not found elsewhere in the NNSA. The increase for ACQ maintains development of qualification methods and certification approaches required by the entirely new designs for programs of record systems. These increases are partially offset by a reduction in Weapons Survivability.	**+51,423**
Inertial Confinement Fusion: The decrease reflects programmatic prioritization toward experimental campaigns and the most important maintenance activities.	**-28,350**
Advanced Simulation and Computing (ASC): The decrease reflects ASC priorities of maintaining facility upkeep, code modernization, and system recapitalization - while continuing to support increased simulation workloads for nuclear weapons mission.	**-7,528**
Weapon Technology and Manufacturing Maturation: The increase reflects additional technologies that have been identified as important for the growing number of potential systems and workload on the complex. These key technologies develop novel manufacturing methods, novel materials, and improve the component design process by leveraging recent advancements in various fields. These advances ensure that the complex remains responsive and able to address increased demands. Additional funding will also support maturation of several key technologies that have never been part of the weapons complex before. These efforts will result in technologies that are easier to transition, manufacturing methods that are more rapid, efficient, and cost effective, and design processes that are more streamlined across the weapons complex.	**+41,580**
Total, Stockpile Research, Technology, and Engineering	**+246,648**

Stockpile Research, Technology, and Engineering
Assessment Science

Overview
The Assessment Science program provides the knowledge and expertise needed to maintain confidence in the nuclear stockpile in the absence of nuclear explosive testing. Capabilities developed and maintained in the Assessment Science program support the entire Nuclear Weapons Complex, providing: (1) the scientific underpinnings required to conduct annual assessments of weapon performance and certification of life extension programs (LEPs); (2) the scientific insight to inform our understanding of the impacts of surveillance findings to ensure that the nuclear stockpile remains safe, secure, and effective; and (3) the core technical expertise required to be responsive to technical developments and geopolitical drivers. Assessment Science also facilitates the assessment of current weapon and weapon component lifetimes, the development and qualification of modern materials and manufacturing processes, the exploration of concepts for component reuse, and the development of modern safety concepts for sustainment.

Assessment Science performs experiments to obtain the materials and nuclear data required to validate and understand the physics of nuclear weapons performance. These include hydrodynamic and subcritical experiments to obtain data on the dynamic behavior of plutonium and surrogate materials in integral geometries. Science program experiments and data analyses also facilitate safety, security, and evaluations of sustainment concepts without the need for additional nuclear explosive testing. These activities develop, exercise, and maintain the expertise and competence of the nuclear weapon design, engineering, and assessment community. This compendium of weapons-relevant data is acquired using unique, small- and large-scale experimental facilities throughout the Department of Energy (DOE) nuclear security enterprise.

Many of the signature efforts enabling science-based stockpile stewardship at NNSA reside in this program. For example:
- Dynamic high- and low-Z (Z pulsed power facility) material experiments.
- Hydrodynamic and subcritical experiments (Dual Axis Radiographic Hydrodynamic Test [DARHT], Contained Firing Facility [CFF]), U1a Complex, proton radiography [pRad] capability at Los Alamos Neutron Science Center [LANSCE]).
- Enhanced Capabilities for Subcritical Experiments (U1a Complex).
- HED experiments (National Ignition Facility [NIF], Z, Omega Laser Facility [Omega]).
- Hostile environment experiments (Z, NIF).

While the research, development, platform deployment, and experimental execution support associated with these efforts reside in Assessment Science, the operational funds for the facilities are included in other program budgets, such as ICF and Infrastructure and Operations.

The Assessment Science program has strong programmatic coupling with the ASC, ICF, Engineering and Integrated Assessments, Weapon Technology and Manufacturing Maturation, and Stockpile Management programs. These program linkages and several crucial cross-cutting, scientific milestones (or pegposts) are captured in the Stewardship Capability Delivery Schedule (SCDS), a long-range communication, integration, and alignment tool that spans science-based stockpile stewardship activities within NNSA.

The Assessment Science program is made up of six subprograms:
1. **Primary Assessment Technologies** provides capabilities essential for annual assessment of stockpile primaries, improvement of the nuclear explosive test modeling suite in the common model framework, certification of future sustainment programs, improvements in primary safety and security, and resolution of Significant Finding Investigations (SFIs).
2. **Dynamic Materials Properties** develops and maintains the experimental capabilities needed to inform modern, physics-based models that describe and predict the behavior of weapon materials in extreme pressure, temperature, and strain rates to understand fundamental material behavior.
3. **Advanced Diagnostics** establishes revolutionary tools for delivering stockpile data by developing next-generation diagnostics, novel methodologies, and advanced drivers for future hydrodynamic, subcritical, and other dynamic experiments.
4. **Secondary Assessment Technologies** provides capabilities essential for the annual assessment of stockpile secondaries through validating weapons physics models using experimental platforms, improving models, expanding the nuclear

explosive test modeling suite in the common model framework, and supporting the evaluation of new manufacturing processes, replacement materials, and aged materials in the stockpile.

5. **Enhanced Capabilities for Subcritical Experiments** establishes a key test capability and closes a capability gap to evaluate the response of plutonium to aging, modern manufacturing techniques, modern materials, and evolving design philosophies. It also enables design certification of nuclear systems without requiring nuclear testing.
6. **Hydrodynamic and Subcritical Execution Support** provides the facilities and services required to maintain a robust testing capability that supplies critical data to weapon physicists and design engineers. These data allow assessments of potential impacts on weapon performance and safety due to design changes, material substitutions, or component changes associated with LEPs, alterations (Alts), or modifications (Mods).

Assessment Science
Primary Assessment Technologies

Description

Primary Assessment Technologies (PAT) provides capabilities essential for the annual assessment of stockpile primaries, certification of future sustainment programs, improvements in primary safety and security, and resolution of SFIs. Primary assessment efforts are focused on improving stockpile stewardship science predictive ability by testing and revising the common framework models to quantify uncertainties. The main objective is to stress these predictions to better quantify performance and confidence in qualification. The predictive models will also include the impact caused by design variance issues, aging effects (time progression decay), and/or variability of manufacturing processes on primary performance. As part of the effort to characterize primary performance, subcritical experiments will incorporate these factors (variance in engineering design, aging effects, and variability in manufacturing processes) to better quantify isolated effects in focused experiments and coupled/correlated effects in integral experiments. The principal focus area of PAT is improving predictive capabilities for modeling boost, and a specific task for PAT is a preliminary examination of pit reuse options to meet requirements. PAT also provides science capabilities for Intelligence Community assessments of foreign-state nuclear weapon activities that concomitantly provide critical weapon design skills, training, and experimental opportunities and challenges for designers and engineers.

Between 2023 and 2025, PAT will be the lead for the 2025 *Advanced Understanding of Primary Performance* pegpost that will lead to better quantification of performance metrics and their uncertainties. This will incorporate improved boost models, plutonium aging data, and the impact of manufacturing variances.

Activities include: (1) design and analysis of hydrodynamic experiments to include subcritical experiments (SCE); (2) experiments supporting burn studies for boost science; (3) Integrated performance and analysis focused on primary's design, construction, and function; (4) nuclear science measurements (e.g., fission cross-sections, fission yield, etc.); and (5) surface science experiments to assess corrosion phenomena.

Other Project Costs (OPCs) for the Los Alamos Neutron Science Center (LANSCE) Modernization Project (LAMP) are funded under PAT and pre-Critical Decision-0 and -1 activities will occur in FY 2024.

Highlights of the FY 2024 Budget

- Support the design, assembly, and analysis of multiple SCEs to understand plutonium aging, and the impacts of modifications and changes in materials (in support of ALTs, MODs, LEPs).
- Support the development and use of platforms (Z, NIF, pRad) to enhance modeling and simulation efforts for the primary portion of the nuclear explosive package (NEP). These experiments are critical to validating our weapons physics models. The experimental validation enables increased confidence in weapon performance through reduced uncertainties.
- Support the re-establishment of plutonium experimentation capability at the LANSCE pRad, which provides critical dynamic performance data for materials and components (new alloys, new manufacturing and processing, and aging studies). Plutonium at proton Radiography (Pu at pRad) will allow cost-effective and quick turn-around experiments supporting integral experiments at Nevada National Security Site (NNSS).

FY 2025 – FY 2028 Key Milestones

- Complete Stewardship Capability Delivery Schedule (SCDS) Level 1 – Advanced Understanding of Primary Performance.
- Perform an analysis of alternatives for the future of the Sandia Boost platform utilizing the knowledge gained from performing the first full containment experiment for Boost platform in FY 2025.
- Execute the first Pu experiment at pRad.
- Field the combined environment Majesty test series.
- Develop a multiprobe diagnostic approach to quantify ejecta mass.
- Evaluate Shallow Bubble Collapse (SBC), a new ejecta production mechanism that can occur under multiple-shock conditions based on the collapse of bubbles near the free surface of the material. This mechanism produces ejected mass that is much greater in quantity than observed in the Richtmyer-Meshkov instability (RMI) case, for several design types.

- Design proposal for a Flex shot (or series) studying SBC in integral geometries.
- Report on the measurement and evaluation of inelastic scattering for actinide and non-actinide isotopes in support of Survivability and ECSE.

FY 2022 Accomplishments

- The Hedonist II overdriven high explosive (HE) experiment was successfully fielded at LANSCE pRad on 11/23/21. This experiment broadens the datasets available for validation of HE modeling, in support of both US stockpile and foreign nuclear weapon assessments. An initial analysis indicates the timing of the detonation wave convergence is well-matched by pre-shot simulations.
- The Pu at Rad project has made major progress on the containment vessel design and is on track for Final Design Reviews.
- The most reliable measurements to date, guided by the LANSCE Chi-Nu experimental team, have been delivered for the 235U Prompt Fission Neutron Spectrum (PFNS).
- 3-D FLAG simulations are being used to determine jet speed for timing of multiprobe diagnostics at pRad.
- A survey of historical approaches to assessing stockpile reliability and to certify the stockpile has been completed.
- Completed first covariance analysis for a “2E” fission product yield measurement using previously collected fission [Time Projection Chamber (TPC)] data. A 2E measurement provided independent (pre-beta-decay) yields, but with low resolution (~5 mass units). Data was useful in fission product data evaluations and highlighted the utility of fission-TPC experiments beyond cross sections.
- Evaluated capability of models in hydrocodes to simulate interfacial mixing. Analyzed a data set from Z of interfacial mixing of shocks launched into a beryllium rod seeded with multi-mode perturbations. Hydrodynamic simulations agreed during single-shock stage but diverged from the data at the time of reshock and later in time, indicating the need for more accurate models of such mixing in convergent geometry in the codes.
- The Pu at pRad project completed the third series of high explosive tests on the inner plutonium confinement vessel (IPCV) design. The test series included 125% over-pressure experiments, both with and without fragment mitigation in the IPCV. The IPCV will next be qualified for the experimental physics package that is planned for the first Pu at pRad experimental campaign.
- Demonstrated the effect of plasma heterogeneity on bulk thermonuclear rates as part of the Marble High Energy Density (HED) campaign. Marble is a unique separated reactants mix campaign to understand the interplay between mix and thermonuclear burn. These data enable the validation of mix and burn models in Los Alamos National Laboratory (LANL) multi-physics simulation codes.
- Preliminary analysis of fission TPC U-235 & U-238 data for fission product yields (FPY) and Total Kinetic Energy (TKE) performed by university collaborators.
- Saturn Scythe-2 provided data for optimization and performance of the Asay foil diagnostic in support of the Nimble SCE.
- New capabilities have been developed in ion implantation to produce samples for aging studies.
- Implemented x-ray diffraction capability on Z, as part of continued collaboration on Montrose platform for targets, diagnostics, and modeling/simulation with successful initial proof-of-concept run. Obtained time-gated x-ray diffraction patterns in Chama chamber with novel Diffraction Scintillator Optic (DISCO) scheme. DISCO holds promise for eventual use to assess phase changes in Special Nuclear Material on Z. The Montrose platform examines the early stages of the primary materials to elucidate the primary yield in a modern designed weapon.

Primary Assessment Technologies
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Primary Assessment Technologies $154,507,000	**Primary Assessment Technologies $160,634,000**	**Primary Assessment Technologies +$6,127,000**
• Conduct proof of concept Montrose experiment and prepare samples for future experiments. • Conduct buildout of Durandal SCE device to include test hydro shots (establish confidence). • Conduct plasma transport experiments on various materials. • Evaluate and validate advanced ejecta physics models that include impact of defects, particle drag, and chemistry effects based on recent experimental results. • Deliver Final Results from Chi Nu for Major Actinides to be used by simulation and evaluation for annual assessments. • Conduct preliminary Pu at pRad on small scale Pu samples with intent to ensure containment and diagnostic calibrations.	• Begin Next Generation Mix and Burn HED Experimental Campaign. • Conduct SPIDER In-Beam Measurements of Fission Mass Yields. • Conduct Post Flex Shot Analysis. • Conduct Boost Physics Experiments on the Montrose Platform for the FY 2025 SCDS Pegpost. • Complete Pu at pRad Experimental Capability. • Conduct Preliminary Neutron Scattering Cross Section Measurements at LANSCE. • Evaluation of Shallow Bubble Collapse (SBC) for several design types. • Conduct Flex Control Physics Post-Shot Report. • Complete Impact of Inhomogeneous Media on Radiation Flow. • Complete Field and Analyze Experiments on Z to Validate Models in Dense Plasma, Multi-Physics Regimes. • Field a subcritical-experiment-capable diagnostic on a surrogate experiment addressing very small sized ejecta, temperature, and ejecta interactions. • Execute the first Pu experiment at Pu at pRad.	• Initial support of pre CD-1 efforts for LAMP. • Supports experiments focused on design and production requirements for validation of modernization weapons design. • Supports the National Plutonium Aging Strategy.

Assessment Science
Dynamic Materials Properties

Description

The Dynamic Materials Properties (DMP) subprogram develops and maintains the experimental capabilities to inform modern, physics-based models. The models describe and predict the behavior of weapon materials in environments of extreme conditions of pressure, temperature, and strain rates to understand how fundamental material behavior (core DMP) impacts nuclear weapon performance. The consideration of pit and secondary component reuse and replacement also requires studies of degradation of materials with age (to include aged plutonium samples) under dynamic conditions to understand potential performance changes. This subprogram provides the experimental data and assessment of Special Nuclear Material (SNM), metals, conventional/insensitive high explosives (CHE/IHE), polymers, and foams under dynamic conditions required for annual assessment and certification of the stockpile as well as for future sustainment options. Aspects of this subprogram link or coordinate with other programs/subprograms within DOE/NNSA, including Physics and Engineering Models (PEM), Aging and Lifetimes, Advanced Manufacturing Development, Plutonium Modernization, High Explosives and Energetics, DOE/Office of Science, and the Department of Defense (Joint DoD/DOE Munitions Program [JMP]). DMP provides much of the experimental results for the National Plutonium Aging Plan and 10-year integrated program plan for Plutonium and Pit Aging.

Research pursued in DMP supports (1) the annual assessment process, (2) baselining of materials properties for the future determination of aging effects (e.g., Pu aging), and (3) consideration of materials replacement and future options for sustainment programs. The characterization of new materials and processes for stockpile applications is an emerging focus for stockpile modernization and responsiveness to enable the use of modern manufacturing techniques. New experimental capabilities are developed to provide the required data for annual assessment and potential future sustainment options. Additionally, DMP will lead a Stewardship Capability Delivery Schedule (SCDS) pegpost in FY 2023 on “Enabling Efficient and Flexible Pit Production.” DMP will also be supporting or leading pegpost efforts in FY 2025 and FY 2027.

The following capabilities are being developed to facilitate certification of pit reuse with insensitive high explosives (IHE) for upcoming sustainment programs: (1) heating and cooling capabilities on dynamic testing platforms, (2) high-pressure experiments on plutonium and other relevant materials, and (3) experiments on aged samples on various experimental platforms. Facilities and drivers to support experimental execution include NIF, Z, Joint Actinide Shock Physics Experimental Research (JASPER), TA-55 gas gun, High Explosives Applications Facility (HEAF), Dynamic Equations-of-State Facility (DEOS), Shock Thermodynamic Applied Research Facility (STAR), Dynamic Integrated Compression Experimental (DICE) Facility, High Pressure – Collaborative Access Team (HP-CAT), and the Dynamic Compression Sector (DCS). Additionally, for long-term certification needs, DMP is exploring alternatives that include expanding x-ray light sources (e.g., Advanced Photon Source [APS]) to characterize high Z materials, metals, and high explosives *in situ* within appropriate physical regimes. In a partnership with the Office of Science/Fusion Energy Sciences (FES), DMP is evaluating long pulse laser requirements to field at an X-ray-Free Electron Laser (XFEL) to complement high-pressure materials research at the APS.

DMP activities include: (1) experimental execution (e.g., equation of state) on high Z materials (including actinides), (2) experiments of low Z materials (including polymers, foams, etc.), (3) experiments to qualify high explosives and energetics, (4) development of high pressure platforms and x-ray light sources to access and characterize materials at extreme conditions, and (5) advanced materials research that includes novel synthesis/formulation and processing methodologies leading to future manufacturing advances.

Highlights of the FY 2024 Budget

- In support of the decadal Plutonium/Pit Aging plan, prioritize properties of aged Pu and replacement materials to increase confidence in stockpile performance and LEPs.
- Emphasize tri-lab strength efforts (unifying the analytic models and multiple data sets for incorporation into simulations) in metals to provide more robust multi-phase equations of state to increase the reliability of models.
- Maintain and enhance capabilities on high-pressure platforms to expand pressure, temperature, and strain rate regimes for high-interest materials.

- Develop new molecules and methodologies for scale-up of candidate IHE to provide better performing and more efficiently produced HE.
- NNSA sectors (HPCAT and DCS) at the APS will return to experimentation after a one-year period in Q3 FY 2024 (APS-U). Use x-ray light sources to develop new methodologies of examining high-interest materials (e.g., metals, HE, additively manufactured materials) under extreme conditions, leading to advanced models with reduced uncertainties.
- Collaborate across Weapons Activities in areas such as plutonium aging, pit production, and high explosives to provide weapons designers with materials options.

FY 2025 – FY 2028 Key Milestones
- Continue execution of experiments in support of the National Plutonium Aging Strategy.
- Provide experimental support (of PAT) for the FY 2025 SCDS pegpost on "Advanced Understanding of Primary Performance".
- Develop HE material options for the future stockpile, including new energetic molecules/formulations in support of the FY 2027 SCDS pegpost on "High Explosive and Energetic Material Options".
- Complete high Z shock ramp compression experiment at NIF up to terapascal pressure to validate and discriminate between equation of state (EOS) models.
- Execute first diffraction experiments in containment geometry on high Z metals, providing the data necessary for multiphase equations of state.

FY 2022 Accomplishments
- The first Pu ramp EOS shot on the NIF was fired, producing high accuracy stress-density measurements in ramp compressed Pu to unprecedented pressures.
- A collaboration between NIF Discovery Science and the Materials experimental team measured the melting curve of iron to 1000 GPa. The experimental platform will be applied for more programmatically relevant materials.
- Completed the first dynamic diamond anvil cell (dDAC) experiments at the European XFEL as well as high pressure DAC experiments of hazardous materials at elevated temperatures.
- Completed experiments with HE molecules (e.g., TATB, LLM-105) on various high-pressure platforms to capture un-reacted EOS and explosive product formation, which are utilized for physics codes.
- Executed back-to-back Z shots for comparison of new and aged plutonium.
- Executed a Pu experiment on Z, designed to inform manufacturing practices for pit production.
- Held the Z futures meeting, which identified the next 5 years of priority materials experiments and capabilities for containment experiments at the Z machine.
- A multi-disciplinary team completed a shipment of Pu experimental waste accumulated over the past eight years from joint LANL-SNL experiments on the SNL Z-Machine. The removal of this waste stream allows for the continuation of key Z-Machine experiments, in support of NNSA's stockpile stewardship program.
- Held several workshops to define mission needs and S&T requirements for potential Defense Materials Science Sector and a high energy long pulse laser at the MEC-U. Aspects of these workshops are in partnership with the Office of Science and build on advances of those x-ray sources (i.e., XFEL and synchrotron).
- Completed EOS Experiments on Polymer Foams utilizing capabilities at DCS and TA-40. The preliminary EOS will benefit the Office of Engineering and Technology Maturationprograms.
- Completed Taylor cylinder experiments on single crystals of Tin to show the evolution into polycrystals following impact.
- Time resolved X-ray diffraction at the Dynamic Compression Sector has been used to determine high pressure phases and reversion for Cerium under shock loading. This work develops multiphase EOS.

Dynamic Materials Properties
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Dynamic Materials Properties $124,366,000	**Dynamic Materials Properties $128,560,000**	**Dynamic Materials Properties +$4,194,000**
• Support operations and experiments at JASPER for the plutonium aging program and provide system availability for certification programs. • Execute experiments in support of National Plutonium Aging Plan on various platforms. • Support FY 2023 Enabling Efficient and Flexible Pit Production with a series of quasi-static experiments to assess the role of impurities on materials properties. • Perform Tiny Stripline Pu experiments with >60% increase in peak pressure as compared to those conducted in FY 2021. • Execute experiments with plutonium on NIF TARDIS platform. • Provide update on tri-lab strength effort with multiphase strength data, including strength data from NIF, TA-55, and Z. • Apply advanced diamond anvil cell capabilities to expand pressure-temperatures conditions and expand to execution on actinides. • Perform EOS measurements of advanced aged plutonium on JASPER. • Execute dynamic experiments on additively manufactured polymer lattices at 3rd generation light sources.	• Prioritize experimental execution in support of the Plutonium and Pit Aging Plan. • Validate constitutive models using Reverse Taylor cylinders to provide updates of strength model. • Evaluate thermodynamic properties of materials with age. • Perform dynamic shear testing/Taylor Cylinder Impact Testing to Validate the Robustness of Strength Models of High-Entropy Alloys (HEAs). • Summarize the current landscape of experimental campaigns at High Energy, 4th Generation X-ray Light Sources. • Analyze Gas-Gun-Based Hole Closure experiments for improving constitutive models. • Execute NIF High-Z Diffraction Experiments on metals using shock and Shock-Ramp Platforms. • Conduct JASPER Shots to evaluate differences in manufacturing processes. • Execute experiments evaluating performance, sensitivity and formulation properties of several polymer bound explosive formulations. • Conduct pyrometry experiments at TA-55 and Z, for comparison of material temperature leading to improved equation of state models.	• The increase supports mission critical activities at JASPER, TA-55 gas gun, and requisite plutonium shots on Z.

Assessment Science
Advanced Diagnostics

Description

The Advanced Diagnostics (AD) subprogram establishes revolutionary tools for delivering stockpile data by developing dynamic experiment diagnostics, novel methodologies, and advanced next-generation drivers for future hydrodynamic, subcritical, and other dynamic experiments. Requirements for new stockpile data are based on recommendations from the weapons design program elements at the Los Alamos and Lawrence Livermore National Laboratories (LANL and LLNL); by the weapons system stewardship activities, including life extension programs (LEPs); and by other subprograms in ICF and Assessment Science Programs.

Priority activities across the AD program include the continued development of the diagnostics, drivers, and methodologies to support the varying needs of the Stockpile Stewardship Program for intermediate- and long-term experiments. These revolutionary technologies motivate new materials models with innovation and design optimization, validate models used in modern design codes, and advance and improve the quality of the scientific results obtained at the experimental facilities.

Efforts to advance drivers include work in traditional pulsed power engineering, R&D for energy storage, power flow and current adder; solid state pulsed power technologies; and application of lasers to produce extreme environments. The development and implementation of new diagnostics for fundamental, focused, and integral experiments include photon, particle, and neutron detectors; visible light cameras; position, velocity, and temperature ("shock wave") diagnostics; advanced (non-x-ray) radiographic techniques such as proton and neutron radiography; and soft x-ray imaging. Methodological improvements for weapons experiments include new techniques for hydrodynamic and subcritical experiments and short-pulse laser-driven electron and ion beam sources.

These revolutionary technologies may provide the technological basis for new NNSA experimental facilities, with the additional benefit of improving the quality and reliability of scientific results at many existing facilities at the national security laboratories and sites. These include the Dual Axis Radiographic Hydrodynamic Test (DARHT), the flash x-ray machine (FXR) at the Contained Firing Facility, Z, Cygnus at the U1a Complex, and the pRad at the Los Alamos Neutron Science Center (LANSCE).

Highlights of the FY 2024 Budget

- Complete design and begin procurements for a 4-pulse, 500-kV scaled injector prototype for cinematographic radiography. Cinematographic radiography will be a new capability that enables capturing a larger number of frames at a near-arbitrary frame rate of the time-evolution of a system under study, and in conjunction with hydrodynamic and subcritical experiments, will provide a robust test of the predictive capability of weapons design codes, reducing the need for nuclear explosive testing.
- Design a dense plasma focus system for CFF as a part of a new dynamic neutron radiography capability, enabling measurement of materials in hydrodynamic experiments. Dynamic neutron radiography will support the fundamental understanding of how plutonium aging and manufacturing variances affect performance, radiographic and reactivity measurements, and assurance of stockpile survivability.
- Expand development efforts to mature compact pulsed power and component-level technologies. High peak pulsed power technology could be applied to multiple, future applications such as next-generation accelerator architecture for combined environments, neutron reactivity source, high flux neutron radiography source, and future programmable waveform driver to explore properties of dynamic materials.
- Advance and begin demonstration of new platforms for environmental control of electrode contamination, dust, and debris for high current accelerators, and begin demonstration of these technologies on Z. If this work proves successful, it will solve a 50-year problem that is unavoidable with certain types of accelerator systems and will provide revolutionary advances in preventing energy loss in current and future systems.
- Research and develop next-generation diagnostics and methodologies for dynamic experiments spanning the entire spectrum from microscale physics to full hydrodynamic tests and evaluate the role that deep machine learning may play in analyzing and fusing radiographic and other data from dynamic experiments. These next-generation

technologies and analytical techniques can significantly impact the development and validation of new models by exploring new regimes or conditions not accessible with current diagnostics or data analysis methods, delivering greater quantity and higher quality of data.

FY 2025 – FY 2028 Key Milestones

- Research and develop next-generation driver technologies that create physical environments needed to anticipate the long-term requirements of the Stockpile Stewardship Program.
- Mature and build prototype technologies for cinematographic radiography for future hydrodynamic and subcritical experiments to provide a robust test of the predictive capability of weapons design codes and help reduce the need for nuclear explosive testing.
- Advance revolutionary radiography and other diagnostics as well as modernize data analysis techniques and models to increase learning from dynamic experiments (e.g., surrogate and plutonium experiments supporting stockpile assessments and LEP developments) through delivery of high-fidelity data, which may provide a better test of current codes, reducing the need for nuclear explosive testing.
- Establish dynamic neutron radiography, which utilizes an intense, pulsed neutron source, as a primary diagnostic system at CFF to support fundamental understanding of how plutonium aging and manufacturing variances affect performance, radiographic and reactivity measurements, and assurance of stockpile survivability.

FY 2022 Accomplishments

- Produced a radiograph through 65 g/cm^2 of material using an x-ray source generated by the NIF ARC laser. Laser-driven x-radiography is a potential path to rapidly re-configurable multi-view radiography.
- Completed an initial study of neutron production from peta-watt laser and matter interaction for future multi-probe radiography; a bright collimated neutron source is an essential tool for future multi-probe radiography of weapon physics experiments.
- Tested and refined development of a new diagnostic (AESOP) to characterize the mass and size distribution of materials ejected in shock-driven experiments.
- Developed and evaluated novel power flow debris shields that reduce contaminants degrading power delivery and support more efficient operations at Z and future pulsed power systems.
- Observed for the first time within multi-frame data, the delay of electrode plasma formation in the magnetically insulated transmission lines while using in-situ plasma cleaning; this work provides better insight into the formation and dynamics of plasmas sourced from surface contaminants which are thought to contribute to current loss in high current transmission lines.
- Successfully collected the first-ever multi-frame digital holographic images of micron-scale ejecta from a series of experiments using a new diagnostic development which can provide information in dynamic shock experiments.
- Successfully demonstrated microwave imaging diagnostic on an HE-driven dynamic experiment, to track detonation front.
- Researched and tested double sided scintillators which show promise for improvements over current capabilities for imaging hydrodynamic experiment.
- Completed conceptual design for a half-voltage injector for cinematographic radiography that will demonstrate multiple electron pulses via active reset.
- Completed the re-design and re-build of the electrode and insulator assembly for the MJOLNIR project to support a new dynamic neutron radiography capability.
- Performed physics-based simulations of a vacuum rod-pinch (VRP) x-ray source to explore methods for improving radiographic performance of the VRP x-ray source at Cygnus.
- Made advances in assessing the potential for “Few-View” radiography for 3D reconstruction of complex objects.
- Built a first generation “production” modular imager for DARHT.

Advanced Diagnostics
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Advanced Diagnostics $31,064,000	**Advanced Diagnostics $35,141,000**	**Advanced Diagnostics +$4,077,000**
• Design and test a quarter-scale pulser prototype, an activity that supports cinematographic radiography, which could provide high fidelity data for hydrodynamic and subcritical experiments. • Continue multi-year effort to mature compact pulsed power and component-level technologies, which could be used to create nuclear weapon-like conditions for assessing the future stockpile. • Execute power flow physics and electrode conditioning experiments and continue power flow modeling and simulation work, advancing understanding in energy loss prevention in current and future systems. • Research and develop next-generation diagnostics and methodologies for fundamental, focused, and integral experiments, which can significantly impact the validation of new models by exploring new regimes not accessible with current technologies, delivering better quality and quantity of data. • Continue to improve modeling/analysis methods (such as those using machine learning), which could help reduce measurement uncertainties and ensure better quality data from experiments.	• Complete design and begin procurements for a 4-pulse, 500 kV injector prototype for cinematographic radiography, which could provide high fidelity data for hydrodynamic and subcritical experiments. • Design a dense plasma focus system for CFF, enabling measurement of materials in hydrodynamic experiments. • Expand development efforts to mature compact pulsed power and component-level technologies, which could be used to create nuclear weapon-like conditions for assessing the future stockpile. • Advance new platforms for environmental control of electrode contamination and begin demonstration of these technologies on Z, for prevention of energy loss in current and future accelerator systems. • Develop next-generation diagnostics, methodologies, and analytical techniques (e.g., machine learning) for dynamic experiments spanning the entire spectrum from microscale physics to full hydrodynamic tests, impacting validation of new models by exploring new regimes not accessible currently, delivering greater quantity and higher quality of data. • Continue modeling improvements, which could reduce measurement uncertainties and ensure better quality data from experiments.	• Increase reflects additional investment in key diagnostic and pulsed power driver activities.

Assessment Science
Secondary Assessment Technologies

Description

The Secondary Assessment Technologies (SAT) subprogram provides capabilities that increase confidence in the assessment of stockpile secondaries, enabling a broad range of sustainment options and resolution of SFIs. A principal focus of SAT is to provide the experimental and science capability used to quantify full system performance margins and associated uncertainties. The subprogram uses historical nuclear explosive test data and conducts and utilizes a variety of above-ground experiments to obtain new data and to develop and validate physical models. These efforts expand the domain of valid modeling tools and qualified experimental platforms to meet the needs of life extension and modernization programs, enabling responsiveness. Key elements include primary output, radiation transport, complex hydrodynamics and burn, material properties, and weapons outputs and effects. For stockpile systems, secondary assessment facilitates (1) the reacceptance of existing secondaries and other nuclear explosive package components for future sustainment options and (2) the development of the science basis for qualification methodology for physics performance of remanufactured canned sub-assembly (CSA) and other components. Secondary Assessment Technologies will continue to advance material research and development initiatives and new manufacturing approaches, supporting technology maturation and technology readiness teams efforts from FY 2021 and FY 2022 in support of the physics qualification of direct cast DU manufacturing, the development of current special materials options and alternate materials for secondaries and underwrite aging mitigation physics and manufacturing options. Using High Energy Density (HED) and non-HED qualified platforms, SAT will evaluate and assess alternate materials of interest for the future stockpile and production modernization.

The subprogram validates the weapons physics models supporting the LEPs and modernization programs, anticipates stockpile responsiveness needs, develops new experimental platforms, continues model improvements, and expands the nuclear explosive test modeling suite in the common model framework. Efforts to evaluate new manufacturing processes, replacement materials, and aged materials in the stockpile and to evaluate their impact on stockpile performance are essential to the LEPs and weapon and production modernization programs. Understanding the impact of manufacturing processes for the production and restoration of CSA components requires both experimental measurements and modeling techniques to address performance impacts. Efforts will continue to develop HED platforms that produce sources to be used in support of weapon outputs, effects, and performance in hostile environments. The capability to address survivability in a hostile environment requires understanding weapon outputs, propagation of outputs, and the subsequent effects coupling into the weapon intended for survival and how the performance of the weapon is impacted. SAT research supporting these goals includes obtaining experimental data supporting weapon design code validation for more accurate weapon output calculations, improving laboratory radiation sources and diagnostics to support code validation and hardware qualification experiments, and developing platforms for evaluating candidates and evolving stockpile technologies for radiation hardness.

SAT has strong programmatic coupling with PAT, ASC, ICF, Engineering and Integrated Assessments, and Weapon Technology and Manufacturing Maturation. SAT has significant coupling to advanced computing platforms and resources supported by the ASC program and to the Weapons Survivability and Aging & Lifetimes subprograms in the Engineering and Integrated Assessments program. SAT partners with Secondary Capability Modernization in executing experiments and relevant analyses supporting physics and engineering qualification of new materials and processes needed for the modernization of stockpile secondaries.

Highlights of the FY 2024 Budget

- Continue to advance materials R&D initiatives and new manufacturing approaches, including direct cast, special materials, and alternate materials to provide options for the future stockpile and to mitigate risk for the modernization programs. Execute initial technology maturation activities and support physics qualification for manufacturing options to mitigate aging.
- Expand the weapon science validation basis using studies of relevant nuclear explosive test data, off-nominal and non-stockpile designs, supporting stockpile assessments, and LEP and modernization decisions.
- Compare opacity data from experiments and theory through national effort at Z, NIF, and Orion; do cross-platform and code comparisons, develop hypotheses for discrepancies and future directions for resolving them.

- Develop platforms and execute experiments in both HED and non-HED venues that inform modeling capability, stockpile sustainment and modernization.
- Continue to apply and advance x-ray environments at HED facilities to meet pegpost deliverables and support stockpile decisions.
- Continue to develop combined environment platforms and study source scaling.

FY 2025 – FY 2028 Key Milestones
- Continue to advance material development initiatives and new manufacturing options to meet pegpost deliverables and to enable a more responsive and manufacturable stockpile.
- Expand the Underground Test (UGT) suite with off-nominal and non-stockpile designs to establish validation basis for more responsive, manufacturable design options and to address secondary relevant issues and support assessments and resolution of SFIs.
- Apply statistical methods to specific physics relevant to secondary performance to inform what experiments may best constrain performance of an untested secondary.
- Develop and qualify new HED and non-HED platforms to deliver constraining data, improve and validate models, and anticipate needs of the modernization programs.
- Advance x-ray environments and deliver threat-relevant sources needed to qualify options for threat mitigation/hostile survivability, including testing at higher levels of integration and more realistic geometries.

FY 2022 Accomplishments
- Executed a broad range of experiments for model validation, material development, and fundamental physics understanding.
- Completed the FY 2022 SCDS pegpost to establish physics properties, draft specifications, inform production requirements, and demonstrate prototype production for special materials to support future stockpile applications.
- Demonstrated technology and completed initial testing for advanced material options, supporting the FY 2022 SCDS Assess Lifetimes & Mitigate Aging pegpost.
- Advanced HED platform design and diagnostic capabilities, fielded experiments, and analyzed data to address secondary performance physics questions, including an assessment of high-pressure equation-of-state platforms and experimentally validating the drive on a radiation transport platform.
- Continued expanding the weapon science validation basis using studies of relevant nuclear explosive test data and off-nominal and non-stockpile designs to advance the understanding of relevant physics processes, increase confidence, and support stockpile assessment and modernization. Compared weapon output predictions between alternate codes and alternate code modules.
- Performed validation of physics modules using existing production codes to inform physics modeling capabilities in the next-generation code.
- Continued to pursue inter-laboratory calibration effort of extinct and long-lived isotopes using historic samples. Completed initial sample exchange and measurements of samples from at least one event.
- With Primary Assessment Technologies, summarized the fission product yield measurement campaigns and continued analysis needed for inclusion in nuclear data evaluations.
- Developed a methodology for determining (n,2n) cross sections using the surrogate measurement technique, building on the successful demonstration for measuring (n,gamma) cross section of short-lived isotopes.
- Continued opacity efforts at NIF, Z, and Orion and worked to resolve discrepancies between experiment and theory. Established reproducibility and quantified improvements to fidelity of iron opacity data from NIF and documented progress toward time-resolved iron opacity measurements on Z. Formalized the approach for comparing data between NIF, Z, and Orion and to theory.
- Completed the design, procured the parts, and assembled the CMOS sensor array, including NIF DIM airbox packaging and integration, for the CMOS-based NIF opacity spectrometer. Formalized procedures for using the instrument to take data on the NIF. Began offline testing, developed a time-resolved spectrometry simulation capability, and formulated a plan for NIF shots for performance qualification of the instrument based on the NIF shot schedule.
- Produced remaining Daedalus V2 CMOS x-ray sensors and continued development work to obtain gate times of 1ns or below.

- Began analysis of existing data and development of theoretical and numerical studies to inform development of x-ray source scaling at higher current, either at Z or for a future facility. Supported experiments to assess survivability of new advanced materials needed for stockpile modernization.

Secondary Assessment Technologies
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Secondary Assessment Technologies $72,104,000	**Secondary Assessment Technologies $74,880,000**	**Secondary Assessment Technologies +$2,776,000**
• Initiate efforts to develop alternate materials and to optimize casting of material of interest and investigate impact of impurities size and distribution on dynamic material behavior to support production modernization. • Continue maturation and physics qualification effort for manufacturing options developed as part of the FY 2022 SCDS Assess Lifetimes & Mitigate Aging pegpost. • Continue inter-laboratory calibration effort of extinct and long-lived isotopes using historic samples. Compare measurements made between laboratories, identify sources of inconsistencies, and determine path forward. • Develop and test a methodology to provide uncertainties for radiochemical cross-sections. • Continue to advance and qualify HED platforms, to address secondary performance physics questions and anticipate needs of the modernization programs. • Complete initial comparisons of experimental and theoretical opacity data of multiple elements acquired at NIF and Z and using multiple opacity codes. Develop hypotheses for discrepancies and future directions to resolve them. • Complete a comparison of weapon output predictions between alternate codes for a defined set of devices, assess prediction similarities and differences to guide modeled and reported uncertainties in weapon output.	• Develop plan to identify and evaluate the physics and engineering performance of alternate materials (FY 2027 SCDS pegpost). • Follow-on to FY 2022 SCDS efforts, improve and optimize initial manufacturing options, parts demonstration, and additional experiments to advance technology and physics understanding. • Complete the three-year inter-laboratory calibration effort of extinct and long-lived isotopes using historic samples: document calibration program and path forward. • Perform modeling and analysis of off-nominal UGT tests to advance understanding of relevant physics processes and expand the validation domain of common modeling methodologies, increasing confidence. • Appraise the impact of certain cross-section uncertainties on UGT observables and highest priorities for future measurements. • Constrain the models of a (n, 2n) cross section of interest using measurements of a surrogate reaction. • Measure supersonic radiation transport through non-porous materials and compare to different models of radiation transport. • Demonstrate progress on tri-lab opacity effort with time-gated measurements to reduce background and increase understanding of time evolution of sample opacity and its impact on discrepancies between experiment and theory;	• Increase provides support for development and evaluation for alternate materials and manufacturing repair options.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
	advance analyses and understanding of opacity of higher-Z elements. • Report on experiments that have advanced our understanding of warm x-ray sources and on progress to reduce uncertainties in power and yield from cold and warm x-ray sources.	

Assessment Science
Enhanced Capabilities for Subcritical Experiments

Description

The stockpile is inherently moving away from the nuclear explosive test database through aggregate influences of aging, modern manufacturing techniques, modern materials, and evolving design philosophies. In 2014, LANL and LLNL jointly identified that a capability gap involving the evaluation of plutonium response exists, which frustrates certification of these changes. In 2016, the JASON Defense Advisory Group identified the same gap in current U.S. capability to carry out and diagnose such experiments; Enhanced Capabilities for Subcritical Experiments (ECSE) will close this gap. Data from ECSE is required as part of the certification of the W87-1 Modification program, as well as future Annual Assessments and LEPs. ECSE delivery in 2030 supports these efforts.

Research has advanced the understanding of plutonium in the early evolution of an imploding system and identified the need to similarly improve understanding of plutonium performance during the extreme physical conditions reached later in an implosion. This improved understanding will inform the evaluation of various components of stockpile transformation and certification of planned LEPs not possible given the current limitations of existing facilities and diagnostic methods. In addition to the physics gap, the National Laboratories have identified a gap in experimental capabilities needed to develop the next generation of weapon designs in the absence of nuclear explosive testing. NNSA has validated this gap via the 2016 JASON study. To fill these gaps and to support the program plan documented in the Stockpile Stewardship and Management Plan (SSMP), NNSA places a high priority on developing ECSE at the Nevada National Security Site's (NNSS) underground laboratory, the U1a Complex.

The ECSE subprogram consolidates a portfolio of work that includes (1) the Major Item of Equipment (MIE) titled Advanced Sources and Detectors (ASD), (2) a developing reactivity measurement technology named NDSE, and (3) ECSE subcritical experiment entombment activities that are completing. Managed by a Federal Project Director accountable under DOE O 413.3B to the ECSE subprogram and to a programmatically aligned Project Management Executive, the construction project 17-D-640, U1a Complex Enhancements Project (UCEP) is funded as a separate line-item. Other Project Costs (OPCs) for the U1a Complex Enhancements Project are funded from the ECSE subprogram. Also managed by the ECSE subprogram while transitioning to line-item construction project management processes, 24-D-513 Z-Pinch Experimental Underground System (Zeus) Test Bed Facilities Improvement (ZTBFI) construction project constructs the test bed that will house the underground NDSE system.

ASD, managed by a Federal Project Director under DOE O 413.3B, designs and installs a large, multi-pulse accelerator system that will generate radiographs necessary to diagnose late-time dynamics in plutonium implosion experiments. ASD is scheduled to complete by the third quarter of 2030. NDSE is a measurement concept that NNSA will apply to dynamic plutonium experiments that will measure the negative reactivity of a subcritical assembly. Since neutron multiplication is sensitive to the material properties of fissile material, the data will provide a new constraint on the codes and models used to simulate the performance of nuclear weapon primaries, improving our stockpile assessment capability. Entombment activities provide a disposition area in the U1a Complex for expended subcritical experiments.

As outlined in the NNSA Stockpile Stewardship Management Plan, NNSA plans long-term investments supporting plutonium science at the NNSS. NNSS is the only site in the United States with the capability to perform experiments combining high explosives and plutonium in significant quantities, a core capability for NNSA's Stockpile Stewardship Program, as per 50 U.S. Code § 2521.

Highlights of the FY 2024 Budget

- Continues delivery of ECSE capabilities in support of the W80-4 confirmation experiment, the W87-1 program certification requirements, and future weapon system certification plans.
- Completes demolition, tunneling, and installation of support services for ECSE expended subcritical experiment entombments at the U1a Complex.
- Performs Area 11 testing of the NDSE system that includes a dense plasma focus, associated detector system, and diagnostics prior to being moved underground to diagnose subcritical experiments in 6' diameter confinement vessels.

- Supports procurements, assembly, and testing of ASD components above ground needed prior to final installation into the U1a Complex.

FY 2025 – FY 2028 Key Milestones
- FY 2026 – Complete the U1a Complex ZEUS Test Bed in preparation for dynamic NDSE experiments.
- FY 2027 – Execute subcritical experiments in the U1a Complex using NDSE.
- FY 2027 – Complete 17-D-640, U1a Complex Enhanced Capabilities project.
- FY 2030 – Complete the ASD installation.
- FY 2031 – Execute subcritical experiments in the U1a Complex SCORPIUS Test Bed using ASD.

FY 2022 Accomplishments
- Completed design of ASD.
- Completed measurement of neutron yield and pulse shape using deuterium/tritium mix.
- Executed Long Lead Procurements for Injector, Solid State Pulsed Power, Integrated Test Stand, and Detector.
- Solid State Pulsed Power has achieved Technology Readiness Level (TRL) 6.
- In support of ASD project, the Prototype Accelerator Module has been completed and assembled for final testing at Accelerator Development Engineering Facility (ADEF) at LANSCE.
- The ZEUS Test Bed entombment drift construction is complete.
- NDSE detector ‘pixel’ assembly has entered the production phase.
- Executed ASD Independent Cost Estimate.
- Executed ASD External Independent Review.

Enhanced Capabilities for Subcritical Experiments
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Enhanced Capabilities for Subcritical Experiments $277,225,000	**Enhanced Capabilities for Subcritical Experiments $292,373,000**	**Enhanced Capabilities for Subcritical Experiments +$15,148,000**
• Continues delivery of ECSE capabilities in support of the W80-4 confirmation experiment, the W87-1 program certification requirements, and future weapon system certification plans. • Complete tunneling via the U1a Complex Enhancements Project. • Completes demolition, tunneling, and installation of support services for ECSE expended subcritical experiment entombments at the U1a Complex. • Start tunneling in support of the ZEUS Test Bed that will support subcritical experiments that establishes a new capability in the U1a Complex to perform dynamic NDSE measurements in 6' diameter confinement vessels. • Achieve CD-2/3 for ASD – approval to begin assembly. • Supports procurements, assembly, and testing of ASD components above ground needed prior to final installation into the U1a Complex.	• Continues delivery of ECSE capabilities in support of the W80-4 confirmation experiment, the W87-1 program certification requirements, and future weapon system certification plans. • Completes demolition, tunneling, and installation of support services for ECSE expended subcritical experiment entombments at the U1a Complex. • Performs Area 11 testing of the NDSE system that includes a dense plasma focus, associated detector system, and diagnostics prior to being moved underground to diagnose subcritical experiments in 6' diameter confinement vessels. • Supports procurements, assembly, and testing of ASD components above ground needed prior to final installation into the U1a Complex.	• The increase supports procurements, assembly, and testing of ASD components above ground needed prior to final installation into the U1a Complex.

Assessment Science
Hydrodynamic and Subcritical Experiment Execution Support

Description

The Hydrodynamic and Subcritical Experiment Execution Support (HSEES) program maintains a robust testing capability to supply critical data to weapon physicists and design engineers, allowing assessment of potential impacts from design changes, material substitutions, or component changes associated with LEPs, Alts, or Mods on weapon performance safety. Experiments are used to assess the effects of component aging or defects identified during stockpile surveillance activities. The data obtained from these experiments are foundational for the annual assessment process, certification decisions, advancement of nuclear weapon science, refinement of weapon computational models, development of emergency response tools, assessment of foreign and terrorist designs, reducing the risk of technological surprise, and developing the skills and experience of weapon physicists and design engineers.

Individual programs determine the need for integral hydrodynamic experiments (hydros) and are responsible for the design, fabrication, and assembly of the test device as well as the post-experiment detailed data analysis that inform the physics models and weapon codes. The HSEES subprogram funds the fielding, diagnostics, execution, initial data analyses, and the disposition/cleanup of the expended hydro experiments. Many of the hydros are conducted in specialized/engineered steel containers (known as "impulsively loaded steel vessels") that confine the high explosives and hazardous material byproducts. For surrogate material hydros (those experiments that do not contain special nuclear material), these vessels undergo a lengthy requalification process post-experiment that entails clean out, weld repair, and inspections. For plutonium experiments executed at the U1a Complex, also known as subcritical experiments, the vessels are entombed underground and removed from inventory. These vessels require extensive engineering and each procurement requires multiple years.

Through interaction with the Department of Defense, the future nuclear weapon stockpile continues to evolve, resulting in high demand for hydro data from weapon physicists and design engineers. Surrogate hydros are conducted at LANL and LLNL facilities, while subcritical experiments are conducted at the NNSS U1a Complex. Enhanced Capabilities for Subcritical Experiments will establish new test beds in the U1a Complex that will require HSEES funding post construction. HSEES along with ECSE supports ZTBFI.

Highlights of the FY 2024 Budget

- Ensures the operational and diagnostic capabilities of the NNSA complex firing facilities are sufficient to execute hydrodynamic tests in support of specific weapon systems (LEP/ALT/MOD), nuclear weapon stockpile, global security, and experimental science.
- Procures, assembles, and fields impulsively loaded steel vessels in support of integral weapon experiments/hydrodynamic tests.
- Provide experimental diagnostics and hardware to firing sites such as DARHT, CFF/FXR, U1a Complex, BEEF, 851, DAF, R306, and Lower Slobbovia.

FY 2025 – FY 2028 Key Milestones

- Provide operational facilities, modern diagnostics, hardware, and personnel to support experiments associated with life extension programs, weapon modification programs, weapon alteration programs, significant finding investigations, the nuclear weapon stockpile, global security, and experimental science.

FY 2022 Accomplishments

- Installed Gen IV mPDV (multiplexed Photon Doppler Velocimetry) diagnostic system at DARHT.
- Tested Nimble Asay ejecta probe configuration and qualified system.
- Completed Cygnus machine refurbishments at the U1a Complex.
- Finished CFF facility repairs; facility returned to service
- Completed Tiffany series of tests in support of ECSE's ASD-Scorpius radiography at DARHT

Hydrodynamic and Subcritical Experiment Execution Support
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Hydrodynamic and Subcritical Experiment Execution Support $142,402,000	**Hydrodynamic and Subcritical Experiment Execution Support $146,163,000**	**Hydrodynamic and Subcritical Experiment Execution Support +$3,761,000**
• Execute hydrodynamic tests in support of LEPs, nuclear weapon stockpile, global security, and experimental science. • Ensure the operational capabilities of the NNSA complex firing point facilities and diagnostics in support of certification, surveillance, SFIs, lifetime extensions and modernization programs, and global security. • Procure, assemble, and field impulsively loaded steel vessels in support of integral weapon experiments hydrodynamic tests. • Provide experimental diagnostics and hardware to firing sites such as DARHT, CFF/FXR, U1a Complex, BEEF, 851, DAF, R306, and Lower Slobbovia.	• Ensures the operational and diagnostic capabilities of the NNSA complex firing facilities are sufficient to execute hydrodynamic tests in support of specific weapon systems (LEP/ALT/MOD), nuclear weapon stockpile, global security, and experimental science. • Procures, assembles, and fields impulsively loaded steel vessels in support of integral weapon experiments/hydrodynamic tests. • Provide experimental diagnostics and hardware to firing sites such as DARHT, CFF/FXR, U1a Complex, BEEF, 851, DAF, R306, and Lower Slobbovia.	• The increase supports current firing sites at LANL, LLNL, and NNSS with experimental diagnostics and hardware.
24-D-513, ZEUS Test Bed Facilities Improvement, NNSS $0	***24-D-513, ZEUS Test Bed Facilities Improvement, NNSS $80,000,000***	***24-D-513, ZEUS Test Bed Facilities Improvement, NNSS +$80,000,000***
• Minor Construction Project redesign.	• Convert Minor Construction Project to Line-Item Construction project in FY 2024. See Construction Project Data Sheet for details.	• The increase supports the full funding request to complete the project. See Construction Project Data Sheet for details.
17-17-D-640, U1a Complex Enhancements Projects, NNSS $53,130,000	***17-D-640, U1a Complex Enhancements Projects, NNSS $126,570,000***	***17-D-640, U1a Complex Enhancements Projects, NNSS +$73,440,000***
• Continue construction of UCEP 020. See Construction Project Data Sheet for details.	• Continue construction of UCEP 020. See Construction Project Data Sheet for details.	• The increase supports continued construction of UCEP-20. See Construction Project Data Sheet for details.

Stockpile Research, Technology, and Engineering
Engineering and Integrated Assessments

Overview

The Engineering and Integrated Assessments program is responsible for ensuring system survivability in present and future stockpile-to-target sequences (STS) and ensures a responsive nuclear deterrent through collaborative partnerships, proactive integration, and assessments. This program supports four key mission areas: (1) strengthening the science, technology, and engineering base by developing advanced capabilities to improve future weapon systems; (2) providing tools for qualifying weapon components and certifying weapons without nuclear explosive testing; (3) supporting annual stockpile assessments through improved weapons surveillance technologies and warhead component aging assessments; and (4) providing capabilities that accelerate the nuclear weapons acquisition process and strengthen the ability of the United States to respond to unexpected developments that could threaten nuclear security.

Engineering and Integrated Assessments is composed of the following programs:

1. **Archiving and Support** preserves and maintains historic knowledge, records, and data related to U.S nuclear weapons testing and Stockpile Stewardship, and provides targeted studies, multi-system assessments, and independent reviews that support the annual assessment of the stockpile.
2. **Delivery Environments** funds the development and application of experimental and modeling capabilities, diagnostics, and data used to evaluate weapon survivability through Normal and Abnormal Environments in current and future Stockpile to Target Sequences – e.g., reentry environments, atmospheric gliding, current and evolving thermal and pressure differentials, maneuvering, shock phenomena, and combined environments.
3. **Weapons Survivability** funds tools and technologies to ensure U.S. weapons will operate through hostile environments such as current and future enemy defenses.
4. **Studies and Assessments** funds pre-Phase 1/6.1 assessments, studies, and other activities, conducts program technical, cost, and feasibility assessments to inform NWC decision-makers of the strategic impacts from the pursuit of various nuclear security enterprise and weapon capabilities in coordination with USSTRATCOM and the Military Services.
5. **Aging and Lifetimes** funds scientific research to understand and mitigate the impacts of aging on materials and components in the stockpile, and develops diagnostics used to assess age-induced impacts on weapon systems.
6. **Stockpile Responsiveness** provides efforts that sustain, enhance, and exercise capabilities required to conceptualize, study, design, develop, engineer, certify, produce, and deploy nuclear weapons. These efforts do not include the actual production or deployment of a stockpile weapon system, nor do they engage in the acquisition of nuclear weapons for the U.S. stockpile.
7. **Advanced Certification and Qualification** funds tools and methods to ensure that there is a certification path for stockpile systems and new components in the absence of additional explosive nuclear testing. This is done by integrating computing, science, technology, and engineering advancements to facilitate certification of future life extensions and other warhead needs.

Engineering and Integrated Assessments
Archiving and Support

Description
The Archiving and Support program is responsible for preserving and maintaining relevant historic records, data, and knowledge related to U.S. nuclear weapons testing and Stockpile Stewardship and providing targeted studies, independent reviews, and multi-system assessments that support the annual assessment process.

Archiving and Support activities include:
Archiving and Data Management (ADAM) – By physically and digitally preserving historical knowledge, records, and data related to U.S. nuclear testing and Stockpile Stewardship efforts, ADAM ensures the continuity of this information beyond the lifetime of its native formats. Additionally, ADAM provides access to the historical archives used across the nuclear security enterprise (NSE) by researchers, scientists, engineers, and other requestors (e.g., the public, educational institutions). Data from the ADAM program is used to maintain and assess the current stockpile; support stockpile modernization; and train the next generation of weapons scientists and engineers.

Assessments and Targeted Studies (A/TS) – Provides multi-system assessments and analyses studies that support (1) weapon certification and safety processes; (2) physics and chemistry weapon assessments; and (3) independent and cross laboratory weapon assessments. This effort concentrates on targeted studies, which are short term, 1-to-2-year, evaluations that focus on specific gaps or results from an assessment.

Highlights of the FY 2024 Budget
The Archiving and Support program continues to directly support NNSA’s priorities to design and deliver the Nation’s nuclear stockpile and leverage transformative technologies to address emerging challenges. Archiving and Support enables NNSA’s mission using world-class science, technology, and engineering while adapting to a specialized workforce through advanced knowledge and records management technologies. Archiving and Support activities include, but are not limited to:

- Ensuring knowledge preservation to inform future stewardship activities, which include but are not limited to:
  - Physical preservation, digitization, and maintenance of large holdings at Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories (SNL), Nevada National Security Site (NNSS), and the Kansas City National Security Campus (KCNSC).
  - Efforts targeted at accelerating the digitization process of all media types (e.g., paper, films, microfilm, microfiche, aperture cards, and other media) through technological advancements, machinery, and training opportunities.
  - Implementing Artificial Intelligence/Machine Learning (AI/ML) tools to ingest, index, catalog, and create metadata on weapons-related documents.
  - Developing a centralized, searchable database to increase accessibility to preserved information.
  - Maintaining the U.S. Geological Survey (USGS) Core Library and Data Center.
  - Funding the Nuclear Testing Archives at Nevada; the National Security Research Center (NSRC) at Los Alamos; Nuclear Test Heritage (NTH) project and Atmospheric Test Film archives at Livermore; the Central Technical Files and other archives at Sandia; and various archival needs at Kansas City.
- Enabling the Cycle 28 Annual Assessment for the nuclear stockpile, which include but are not limited to:
  - Performing radiochemistry efforts for data analysis; full system modeling; engineering baseline analysis; and high explosive and special nuclear material physics studies.
  - Supporting targeted stockpile studies and weapon-program agnostic research and development.
  - Executing the Independent Nuclear Weapons Assessment program (INWAP) for Cycle 29 (CY2024).
- Maintaining and/or upgrades the capabilities that support Archiving and Support, including but not limited to:
  - Funding computer upgrades, software licenses, and other basic infrastructure needs.
  - Maintaining seismic monitoring stations that record seismic measurements of experimental explosions and subcritical experiments; provides verification monitoring data for the Comprehensive Nuclear- Test-Ban Treaty.
  - Upgrading and purchasing of specialized equipment used to digitize unique and critical archives dating back to the Manhattan Project.

FY 2025 – FY 2028 Key Milestones

- Expand the ADAM program by incorporating all NSE sites requiring digitization.
- Provide an NSE-wide, searchable database of archived materials.
- Establish inter-site relationships and processes to increase productivity.
- Apply advanced AI/ML to enhance digitization and search and recall capabilities.
- Fund a Nuclear Security Enterprise (NSE)-wide license for Titan Technologies: Compendia Data Platform, an AI/ML software integration tool for cataloguing, indexing, and generating metadata for digitized documents.
- Continue to support the Annual Assessment reporting process.
- Develop and demonstrate and understanding of weapon system concepts.
- Document the contributions of each long-term activity.

FY 2022 Accomplishments

- Executed contract with Titan vendor for both development and production licenses on the classified networks that will use AI/ML technologies to catalog and search the National Security Research Center's (NSRC) digital collections. Less than 10% of the NSRC's collections have been digitized and less than 10% of those digitized collections have been cataloged. Without this artificial intelligence/machine learning system to catalog and search the digitized collections, the digitized files are very difficult and sometimes impossible to find.
- Established the Rocky Flats Digitization Laboratory, the seventh high speed digitization lab at LANL.
- Hired new research librarians and historians to support continued improvement of the digitization and archiving activities for Weapons Program knowledge management. Implemented a digitizing equipment certification program to guarantee all staff know how to operate the new high-speed digitizing equipment and the relevant digitizing standards to use.
- Developed a graphical user interface at LLNL that enables access to a comprehensive archive of digitized films, reports, and data.
- Completed the final version of the Weapons Testing Ontology and the initial version of the Rocky Flats Ontology.
- Maintained workforce pipelines through summer internship programs and DEIA initiative programs at LLNL including the Neurodiversity Intern program and a pilot project for joint NNSS/LLNL summer interns.
- Developed software to accelerate optical character recognition processing of geophysical well logs by a factor of 10.
- Developed Standard Operating Procedures at LLNL for selected workflow processes supporting the archiving "pipeline" to assure consistency.
- Completed installation of industry-standard equipment to increase scanning capacity and acceleration of digitization.
- Continued digitization and upload of Tonopah Test Range films into the Digital Media Archive at SNL.
- Archived core from underground tests were analyzed to explore the value of new diagnostic measurements to constrain weapon physics simulations.
- Continued collaboration between sites to increase productivity.
- Improved several key processes in digitization and document processing, as well as modeling and simulation tools that will benefit the development of program capabilities. Supported Cycle 26 Annual Assessment activities and completed all planned INWAP studies.
- Developed On the Job Training Animation software in LANL's Weapon Response group. This life-like animation matches exactly what a worker would see and do while assembling and disassembling a weapon system allowing workers to practice and develop muscle memory in a realistic situation, but one with no consequences if there is an error.
- Developed of a Computational Fluid Dynamics (CFD) capability at LANL.

Archiving and Support
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Archiving and Support $43,950,000	**Archiving and Support $44,805,000**	**Archiving and Support +$855,000**
• Support Cycle 278 Annual Assessment activities and complete all scheduled INWAP activities in accordance with the INWAP. • Identify and conduct targeted multi-system studies and assessments identified during the Cycle 28 Annual Assessment process. • Perform stockpile studies that improve physical models for assessments and improve modeling methodology. • Support development of physics baseline common model framework. • Support the Nuclear Testing Archives and the National Security Research Center (NSRC). • Support the Capabilities for Nuclear Intelligence (CNI) Practicum. • Perform ongoing digitization of paper, film, microfiche, microfilm, aperture cards, and other media and collect and catalog metadata. • Perform ongoing digitization of paper, film, microfiche, microfilm, aperture cards, and other media and collect and catalog metadata. • Continue analysis of archival test cores to generate new data used to support LEPs and Annual Assessment. • Continue acceleration efforts to increase digitization speed and efficiency. • Continue early investments in machine learning for metadata collection.	• Support Cycle 29 Annual Assessment activities and complete all scheduled INWAP activities in accordance with the INWAP. • Identify and conduct targeted multi-system studies and assessments identified during the Cycle 29 Annual Assessment process. • Perform stockpile studies that improve physical models for assessments and improve modeling methodology. • Support development of physics baseline common model framework. • Support all participating sites archives and repositories • Support the Capabilities for Nuclear Intelligence (CNI) Practicum. • Perform ongoing digitization of paper, film, microfiche, microfilm, aperture cards, and all other media types • Perform ongoing physical preservation of paper, film, microfiche, microfilm, aperture cards, and all other media types • Capture, collect, and catalog extensive metadata. • Continue analysis of archival test cores to generate new data used to support LEPs and Annual Assessment. • Continue and invest in acceleration efforts to increase digitization speed and efficiency. • Continue early investments in artificial intelligence machine learning (Titan Compendia) for metadata collection. • Invest in AI/ML infrastructure (databases, servers, cyber-security measures).	• The increase reflects investment in artificial intelligence / machine learning tools and continued development in data management efficiencies specifically for tagging and metadata to provide information accessibility to nuclear weapon designers and producers. • Investments in AI/ML infrastructure, licensing, and fees are required to stand up a new system at LLNL and KCNSC. • Investments in compliant storage are needed to protect at-risk media and prevent degradation. • Specialized equipment purchases and repair is needed for obsolete data types. • Invest in workforce pipelines within the fields of library and archival sciences to expand the potential workforce of the Nuclear Security Enterprise.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Support digitization, storage, indexing, and librarian services relative to nuclear security materials. • Maintain electronic repositories for existing and new digitized nuclear security materials. • Capture legacy test data in GRANTA. • Maintain PDM Link, and Abacus licensing as needed to support multi-system assessment work and the archives. • Support the U.S. Geological Survey, seismic monitoring, risk reduction, and maintaining compliance with Federal Facility Agreement & Consent Order (FFACO). • Maintain computer licensing and equipment upgrades; purchase digitization equipment to support acceleration activities. • Provide M&O detail support at headquarters. • Revitalize the radiochemical analyses of historical core samples by analyzing archival test cores to generate new data to address question of life extension programs (LEPs). • Support the next generation workforce through neurodiversity programs and internships. • Expand the workforce with highly trained field experts in library science and history.	• Support digitization, storage, indexing, and librarian services relative to nuclear security materials. • Maintain electronic repositories for existing and new digitized nuclear security materials. • Capture legacy test data in GRANTA. • Maintain PDM Link, and Abacus licensing as needed to support multi-system assessment work and the archives. • Support the U.S. Geological Survey, seismic monitoring, risk reduction, and maintaining compliance with FFACO. • Upgrade, repair and/or purchase equipment to support models and simulation development. • Repair and/or purchase specialized digitization equipment to support acceleration activities. • Invest in storage compliant with current NARA requirements. • Provide M&O detail support at headquarters. • Revitalize the radiochemical analyses of historical core samples by analyzing archival test cores to generate new data to address question of life extension programs (LEPs). • Support the next generation workforce through neurodiversity programs and internships. • Expand the workforce with highly trained field experts in library science and history.	

Engineering and Integrated Assessments
Delivery Environments

Description

Future delivery systems and platforms will be characterized by Stockpile to Target Sequences (STSs) different from those for the current stockpile. The Delivery Environments (DE) program ensures delivery systems and platforms survive current and future STSs in *Normal* and *Abnormal* environments. Select environmental examples include reentry environments, atmospheric gliding, evolving thermal and pressure differentials for prolonged periods of time, shock phenomena, and combined environments. The Delivery Environments Program's primary objective is to elucidate and quantitatively assess the survivability of delivery systems in mission environments. The Delivery Environments Program thus identifies, evaluates, and predicts delivery platform system and sub-system responses to such environmental phenomena through program-developed modeling and simulation, diagnostics, and experimental tests. The Delivery Environments Program furthers its objectives by working with various interagency and interoffice collaborations to ensure proper priority and scope prioritization and alignment.

Delivery Environments activities include:

Mission Flight – The Program designs, analyzes, and engineers Normal and Abnormal Environment Survivability capabilities relevant to the Department of Defense's (DoD's) delivery systems to meet performance requirements for current and future Stockpile-to-Target Sequences. Select examples include the modeling and testing of shock, vibration, thermal stresses, pressure strains, adverse and normal effects, the collaborative combination of these environments with hostile or abnormal environments, and the effects of these phenomena on nuclear and non-nuclear weapon components and systems. This program works closely with the Weapons Survivability (WS) Program, the Stockpile Responsiveness Program (SRP), the Office of Advanced Simulation and Computing (ASC) , the DoD, and Intelligence Community to ensure informed decisions, prioritization, and resource optimization.

Abnormal Environments – The Program also evaluate the survivability and effectiveness of current, emerging, and future weapon systems following accident scenarios or unexpected adverse events that could impact performance. Select examples include internal electromagnetic interference, crash and burn, lightning events, drops during the handling and/or mounting of a weapon, crash and burn, bunker fires, aircraft crashes, transportation accidents, and even adverse weather encountered during mission execution. This program collaborates with the Office of Advanced Simulation and Computing to ensure experiments and predictive capabilities are jointly developed.

Current and Future Stockpile Components – In addition to considering future systems, the Delivery Environments program also focuses on qualified stockpile components and investigates the application of said components for future Stockpile-to-Target Sequences and related survivability requirements.

Highlights of the FY 2024 Budget

- Benchmark and enable tools for emerging and future combined environment. Select examples include the shaker table for multi-axis vibration testing andthe Horizontal Air Bearing and humidity testing to evaluate performance of new experimental capability for separation shock and kick-off. These tools will help emerging systems, such as theW93, in their developmental testing.
- Expand single-axis vibration testing to three axes in efforts to identify unknown flight test data for future Stockpile to Target Sequences. This work will be furthered by collaborating with the Joint Technology Demonstrator (JTD) program and Testbeds to Reduce Uncertainties in Simulations and Tests (TRUST) to integrate and evaluate instrumentation.
- Develop advanced combined-environment testing techniques across various experimental testing capabilities, includingmulti-axis vibration, superfuge, combined electromagnetics and vibration, and multi-axis hostile shock. Deploy novel diagnostics for the combined-environment tests so that the proper data is collected and analyzed. Formalize the environmental specification process for advanced ground-based testing techniques.
- Develop a robust deployment strategy and generalize agile models and workflows for Sora (LLNL Flight Simulation Code) in preparation for performing the design optimization for advanced future systems.

- Collaborate with the Stockpile Responsiveness Program to successfully execute the Sled Test Analysis and Engineering Design at Full Scale to demonstrate underlying technology to hold challenging targets at risk.
- Collaborate with the Air Force on the AFRL/NNSA joint integration study and the joint advancement of aerothermal analysis capabilities.

FY 2025 – FY 2028 Key Milestones

- Deliver the SCDS FY 2026 Combined Threat Environments Simulation Pegpost in partnership with the Weapons Survivability Program and the Office of Advanced Simulation and Computing, incorporating predictive and experimental capabilities across delivery and hostile environments.
- Continue the Program's 10 Year Strategic Plan that forecasts and advances the development and systematic progression for systems through current-intermediate-future delivery platforms and environments.
- Support preparedness exercises by developing advanced modeling, simulation, and experimental capabilities to enable combined environment evaluation of components, sub-systems, and systems in future Stockpile-to-Target Sequence environments.
- Advance benchmarking and evaluation of computational and experimental capabilities relative to current/future environments, thus enabling the mapping of future failure modes and quantify margins/uncertainties in such environments.
- Mature emerging and future threat-informed capabilities to conduct multidisciplinary design optimization of future systems. This will help assess the accuracy, uncertainty, and margin of the design capability by utilizing performance parameters.
- Predict combined aero and vibration flight environments experiments, replicate combined mechanical environments on ground tests, and provide data to validate high-enthalpy and aero-chemistry models used in flight environments.

FY 2022 Accomplishments

- Collaborated with the Stockpile Responsiveness Program on the Sled Test Analysis and Engineering Design at Full Scale. Procured sled test article hardware for the full-scale sled test and finalized diagnostics integration with Holloman High Speed Test Track.
- Characterized future environments for vehicles/missions using modeling and simulation capabilities. Bounded environments from LLNL simulations and data analysis were included in the updated draft future flight environments survey.
- Developed pre- and post-processing support for thermal reduced order model within Sora (LLNL Flight Simulation Code). Demonstrated the insensitivity to thermal environments in problems of interest.
- Completed the first wind tunnel test of the hypersonic finned cone via the Hypersonic Wind Tunnel (HWT). Analyzed the unsteady loading data on this advanced geometry to characterize the resulting fluid structure interaction.
- Leveraged ASC V&V project work on Multiple Input, Multiple Output powered flight specification derivation methods. Developed necessary elements to perform a multi-axis powered flight vibration test. Performed demonstration experiment on HOT Shot payload using flight-measured responses; this test helped improve confidence in measurements and data collection capabilities for future ground and flight-testing operations, ground, and test flights in preparing for future platforms and environments.
- Matured plans for FY 2023 efforts toward evaluating displacement and shock/vibration sensors and met with JTD team to discuss opportunities for instrumentation.

Delivery Environments
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Delivery Environments $37,674,000	**Delivery Environments $38,388,000**	**Delivery Environments +$714,000**
• Deliver the FY 2023 Survivability for Reentry Environments Pegpost under the Stockpile Capability Delivery Schedule (SCDS). • Conduct the sled-test experiment – "Deep Core" – at Holloman Air Force Base, in partnership with the Stockpile Responsiveness Program (SRP) and the Air Force. The effort is supported by LLNL and SNL. • Conduct joint studies with the Air Force Research Laboratory and the Air Force Nuclear Weapons Center on reentry survivability predictive capabilities for advanced applications. • Begin coordinating the SCDS FY 2026 Combined Threat Environments Simulation Pegpost in partnership with the Weapons Survivability Program.	• Execute the sled-test experiment – "Deep Core" – at Holloman Air Force Base, in partnership with the Stockpile Responsiveness Program and the Air Force. The effort is supported by LLNL and SNL. • Steward existing interagency and interoffice projects that require collaborative efforts in predicting and evaluating future system and mission requirements. Select examples include the Nuclear Posture Review, JASONs studies, and Interagency Roadmap Development with AFRL and Navy SSP. • Coordinate efforts with the Air Force and Navy on future system reentry survivability in Normal and Abnormal Environments, and jointly develop the necessary tools to make such evaluations and assessments. This work will also support the recently proposed NNSA/AFRL/Navy SSP Joint Roadmap. • Collaborate with the Weapons Survivability Program and Integrated Assessments on areas of overlap with respect to interagency partnerships. • Initiate the planning stage for the SCDS FY 2026 Combined Threat Environments Simulation Pegpost in partnership with the Weapons Survivability Program and the Office of Advanced Computing and Simulation.	• The increase will enable the Delivery Environments Program to continue supporting priority interagency and interoffice projects that require collaborative efforts in predicting and evaluating future system and mission requirements. Select examples include the Nuclear Posture Review, JASONs studies, and Interagency Roadmap Development with AFRL and Navy SSP. • The increase will also enable the Program to survey existing capabilities for combined environments that will be used to support the planning-stage of the Hostile Mitigation Combined Environment FY 2026 Pegpost.

Engineering and Integrated Assessments
Weapons Survivability

Description
Weapons Survivability provides the tools and technologies necessary for ensuring U.S. nuclear weapons survivability in hostile and fratricide environments. Since weapons entering the stockpile are expected to be fielded for decades, Weapons Survivability includes projections for the evolution of defensive technologies and threats

Weapons Survivability scope includes: (1) developing scientific and engineering models for understanding radiation effects; (2) improving laboratory radiation sources and diagnostics to support code validation and hardware qualification experiments; (3) generating experimental data to validate scientific and engineering models; (4) understanding radiation-hardened design strategies; and (5) evaluating candidate and evolving stockpile technologies for radiation hardness capabilities in a generalized, weapon-relevant configuration.

Weapons Survivability activities include:
System-Generated Electro-Magnetic Pulse (SGEMP) and Electro-Magnetic Pulse (EMP) Effects – Several electromagnetic (EM) effects driven by x-rays, gamma, and high-power EM sources can induce detrimental responses to nuclear and non-nuclear electrical components of the warhead. A particular effect of concern is System Generated Electromagnetic Pulse (SGEMP), whereby photons with sufficient energy to penetrate and interact with materials inside the weapon produce energetic electrons generating large currents within the weapon. Cable SGEMP and Box Internal Electromagnetic Pulse (IEMP) are variations associated with cables and components. Understanding SGEMP (and its various counterparts, i.e., xEMP) requires knowledge of physical phenomena, including radiation transport across complex material interfaces; photo emission; radiation-induced conductivity in solids, foams, and gases; time-dependent dielectric breakdown phenomena; and EM coupling through plasmas. Importantly, the responses are highly dependent on the temporal and spectral content of the radiation drive, the properties of the materials undergoing irradiation, and the coupling between subsystems.

Related to this is the production of EMP environments driven in the atmosphere whereby x-rays and high energy gamma rays dissociate the atmosphere, produce conductivity, which drives currents and high frequency electromagnetic pulses. These environments can induce detrimental responses inside the weapon, depending on Reentry Vehicle/Reentry Body shielding effectiveness.

Presently, there are limited high-fidelity experimental and test environments for driving relevant SGEMP/xEMP responses. Current and planned capabilities utilizing the Saturn and High Energy Radiation Megavolt Electron Source III (HERMES III) Accelerators, the National Ignition Facility (NIF), and Z cannot adequately support component, subsystem, or system-level testing for many of the xEMP effects, particularly those driven by x-rays. In the absence of suitable testing capabilities (e.g., adequate fluence, spectrum, volume, time history, etc.), this effort has a strong focus on developing experimental platforms for physics discovery and code validation to support computational capabilities that enable the qualification of components for x-ray driven EM effects while advancing present phenomena understanding for future applications. In addition, this effort develops the platforms and diagnostics for test and evaluation that allows creation of relevant high fidelity (real or surrogate) environments.

Effects of X-rays and Air Blast on Materials – This effort includes all activities related to material and structural responses driven by x-rays and air blast. The effort is relevant to the study of both exo-atmospheric nuclear burst encounters, as well as endo-atmospheric encounters. Structural effects and response from exposure to air blast can become significant for the terminal phase of flight. Limited high fidelity testing capabilities exist for analyzing and assessing these effects; for example, radiation testing is limited to small objects over a restricted range of photon energy. Mechanical surrogates are used in many cases for system- level qualification for both cold x-rays and air blast. Hence, validated modeling and simulation capabilities are vital to understanding these effects and validating the efficacy of the surrogate platforms. Select activities include direct testing of materials and components at radiation generating facilities, development of diagnostics and platforms to increase the applicability of these facilities, development of surrogate testing capabilities (e.g., explosive drives, intense particle beams or optical [intense laser] light), and development and validation of modeling and simulation capabilities based on modern codes. Key facilities of use include the Z, NIF, Light Initiated High Explosive Facility, and related gas-gun capabilities.

Neutron Effects – Neutron radiation from nearby nuclear bursts has the potential to cause damage to various warhead components. For endo-atmospheric engagements, neutrons can be effective at ranges that are large relative to the effective ranges of other radiation. Assessing the effects of neutron exposure to warhead components requires understanding these interactions over a significant range of energies and pulse shapes. Importantly, exo-atmospheric engagements require knowledge of high energy (14 mega-electron volts [MeV]) neutron effects.

This effort includes direct testing of materials and components along with developing corresponding modeling and simulation tools. Specific activities include: modeling and experiments to investigate fission heating, modeling to quantify the initiation response to external neutron fields, experiments and modeling to investigate displacement damage in semiconductors and other electronic effects, obtaining calibration data for neutron radiation aware micro-electronics models, facility and diagnostic development, material aging effects on neutron environment survivability development, and validation of modeling and simulation capability based on modern codes. Key facilities of use include Annular Core Research Reactor facility (ACRR) and NIF.

High Energy Photon Effects – This effort primarily focuses on the study of energy (dose) and power (dose rate) deposition in material of high energy (i.e., > 1 MeV) photons. High energy photons can penetrate deep into the interior of a weapon and cause disruptions, error readouts, and burnout of critical electronics. This effort encompasses electrical component response to dose-rate effects; single electron effects, high energy photon transport in materials, radiation hardened micro-electronics design, and the study of long lifetime intrinsic radiation (INRAD) effects found within the warhead. The INRAD activity is primarily focused on the development of capability to characterize the INRAD environment and assess aging of critical components exposed to INRAD.

Weapon Output – A robust survivability capability relies upon the understanding and analyses of foreign weapon threats and their outputs. Until recently, legacy tools that were validated using underground test data were exclusively used. These legacy tools are reaching the end of their lives, so this effort supports the process for modernizing and improving tools and methodologies. Improved physics fidelity and hydrodynamics over longer simulation times is a cornerstone of this development. Validation of these new tools is necessary and will be accomplished using a combination of underground test data and above ground experiments. This is coupled with higher-fidelity diagnostics to enhance the calculated uncertainties associated with weapon output modeling.

Further, the propagation and quantification of uncertainties is paramount to understanding margins and providing certification assurances for survivability analysis. A robust understanding of survivability margins cannot be achieved without uncertainty quantification imbedded within the hostile threat characterization. This effort focuses on establishing a more comprehensive understanding of the required modeling fidelity based on understanding of weapon output uncertainty propagation in the mechanical and electrical response of components and systems, more transparent and functional databases, and improved visualization software.

Combined Environments – Legacy survivability analyses have generally been performed by separating and addressing individual effects, one at a time. As computational tools, diagnostics, and technology insertion have become more flexible and robust, assessments of combined environments are now possible. This effort focuses on the development of experimental facilities, including conceptual design for CREST, and platforms for combined environment testing (e.g., radiation + mechanical, radiation + EMP, etc.), combined effects response discovery and analysis, and analysis of effects at high levels of integration. It also supports the development and validation of modeling and simulation capabilities based on modern codes. Further, data generated with combined survivability assessments can be utilized to improve understanding of integrated weapon response, electrical response, and terminal flight dynamics of U.S. warheads after a hostile or fratricide engagement.

Highlights of the FY 2024 Budget

- Execute a planned 160 research and development and qualification capability development shots on high energy density (NIF and Z) and radiation environment (Saturn, Hermes, ACRR, etc.) machines and facilities.
- Develop laboratory weapon qualification platforms that reproduce and simulate the hostile environments and effects.
- Further improve experimental capabilities for delivery systems that enable development of mitigation mechanisms capable of addressing current and future hostile threats.
- Provide experimental tools and simulation capabilities for systems to qualify the behavior of electronics in radiation and combined environments.
- Continue efforts in CREST to address the programmatic and enterprise impacts from the aging ACRR facility and requirements for a reactor-based weapons survivability capability. Execute conceptual design activities for CREST, including efforts to refine cost estimates, complete project definition, development of architectural drawings, electrical and power distribution system layout, and design basis activities (e.g., operations, maintenance, security, and radiation protection requirements).

FY 2025 – FY 2028 Key Milestones

- Maintain and extend nuclear environment test capabilities at the Hermes, Saturn, Annular Core Research Reactor (ACRR), and the NIF facilities.
- Achieve CREST CD-1.
- Deliver modeling, simulation, and testing capabilities to support qualification of new components designed to mitigate modern and future hostile environments.
- Continue to collaborate with Delivery Environments and Advanced Simulation and Computing programs on the SCDS FY 2026 Combined Threat Environments Simulation pegpost.

FY 2022 Accomplishments

- Completed the updated draft Warhead Hostile Environment Survivability Plan (WHESP).
- Continued investigation into past testing air blast studies to compare results to current models, aiming to correctly simulate the arrival time of the blast wave on a test object.
- Established new capabilities to simulate re-entry vehicles (RVs) interacting with blast shock including a high-speed RV traveling through a large atmospheric blast.
- Completed an electron beam capability development shot series demonstrating that a newly designed source can be an effective tool for evaluating thermomechanical and thermostructural response in materials.
- Completed test and modeling campaign to assess the dose rate responses of Hetero Junction Bipolar Transistors (HBTs) in integrated circuits to better understand how radiation exposure effects HBTs across multiple bias states which may lead to more flexibility in test and qualification strategies, better utilization of test facilities, and increased understanding of combined radiation environment effects in transistors.
- Continued work on a Bayesian analysis approach to evaluate blast wave velocity along a re-entry vehicle to predict the time of arrival equation parameters and expand to predict incident angle.
- Delivered survivability evidence in support of the W93 advancement to Phase 2.
- Successfully fielded an experiment for model validation in-core at the WSMR FBR, a first of its kind operation for many personnel at the facility and laboratory.
- Completed experiments on Z Machine to measure thermomechanical shocks (TMS) in materials after exposure to warm x-rays including first dedicated use of a novel greater than 8 keV photon-energy source for a radiation effects science experiment, enabling significantly higher x-ray fluence on materials under test.
- Conducted pre-conceptual design activities in support of CREST and prepared to enter conceptual design phase.

Weapons Survivability
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Weapons Survivability $93,303,000	**Weapons Survivability $88,368,000.00**	**Weapons Survivability -$4,935,000**
• Continue development and expansion of diagnostics for environment characterization and response data. • Complete the SCDS FY 2023 Hostile Mitigation pegpost. • Continue support of conceptual design activities for the CREST facility. • Establish broader use of uncertainty quantification across hostile engagement applications. • Continue experimental source development for enhanced hostile environments. • Improve ability to field flexible test and experiment platforms for combined environments testing for device level physics research. • Further high explosive blast analysis capability development, experiment design, diagnostic development.	• Complete initial demonstrations of modern neutron, x-ray, and blast effects simulation tools with capability that will be applied to the W87-1, the W93, and other systems, including improved fidelity of source generation calculations. • Continue experimental platform development including diagnostics to test relevant samples exposed to neutrons and combined environments. • Expand surrogate combined environment (neutron+gamma) platforms for micro-electronics experiments. • Advance simulation capability development for future threat threats, building both the capacity to calculate the hostile environment produced as well as the resulting impacts on weapon systems. • Expansion of weapon output modeling capabilities toward a transition from legacy tools to modern computational tools. • Initial demonstrations of laser-generated blast wave coupling with projectile flight and associated diagnostic development and computational analysis in comparison with high explosive-generated blast wave couple with projectile flight validation experiments. • Continue support of conceptual design activities for the CREST facility.	• The decrease reflects a decision to extend the planning period for CREST, given the complexities of the project, while ensuring sufficient enterprise capacity to complete ongoing construction projects.

Engineering and Integrated Assessments
Studies and Assessments

Description

The Studies and Assessments Program, established by Congress in FY 2020, improves oversight and visibility of pre-Phase X / 6.X assessments. Beginning in FY 2023, this program improves the ability of the Office of Defense Programs to rapidly respond to Nuclear Weapons Council (NWC) requests for joint studies of potential weapon and nuclear security enterprise (NSE) capabilities. These studies result in preliminary technical, cost, and program feasibility assessments to inform NWC decisions about the future nuclear weapon stockpile and supporting enterprise. The Studies and Assessments program collaborates with other Engineering and Integrated Assessments and Weapon Technology and Manufacturing Maturation programs to align their scope with these future capability needs, as well as with other NNSA programs to coordinate impacts from these studies. Additionally, Studies and Assessments will develop innovative business practices to improve NSE collaboration and agility.

Highlights of the FY 2024 Budget

- Explore NNSA weapon design options and potential stockpile-to-target sequence (STS) environments for a Future Strategic Warhead (FSW), per NWC strategic direction.
- Begin the first of the two-year Phase 1 (Concept Assessment) of the Non-Ballistic Reentry Vehicle program, per NWC strategic direction.
- Commence the first of the two-year of the Phase 1 (Concept Assessment) of the Hard and Deeply Buried program, per NWC strategic direction.
- Perform tri-lab (LANL, LLNL, and SNL) Net Assessment. to address the dynamic environment with two-near-peer competitors and a rapidly changing threats necessitates NNSA to capture the dynamics on these areas and where NNSA needs to pivot to address strengths and weaknesses to impact the complex and weapons designs and fielding. These Net assessments will offer critical insights to senior leaders on the relative NNSA capabilities over time.

FY 2025 – FY 2028 Key Milestones

- Conduct early weapon design option studies and STS environment analyses to identify research and development activities for the FSW, per NWC strategic direction.
- In coordination with USSTRATCOM and the Military Services, conduct program technical, cost, and feasibility assessments to inform NWC decision-makers of the strategic impacts from the pursuit of various nuclear security enterprise and weapon capabilities.
- Complete the second year of the Non-Ballistic Reentry Vehicle Phase 1, per NWC strategic decision.
- Complete the second year of the Hard and Deeply Buried Phase 1, per NWC strategic decision.

FY 2022 Accomplishments

- Completed W93/ Mk7 Phase 1, Concept Assessment 6 months ahead of original schedule.
- Completed Next Generation Reentry Vehicle (NGRV) Year 1 technical feasibility study.
- Completed NGRV 60 Day Feasibility Study as requested by the U.S. Air Force to determine the feasibility of incorporating W87-1 warhead design features and components into a new Reentry Vehicle (RV) warhead design.

Studies and Assessments
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Studies and Assessments $5,000,000	**Studies and Assessments $79,924,000**	**Studies and Assessments +$74,924,000**
• Explore NNSA weapon design options and potential stockpile-to-target sequence (STS) environments in support of the U.S. Air Force Next Generation Reentry Vehicles study, which examines future aeroshell concepts for the LGM-35A Sentinel, also known as the Ground-Based Strategic Deterrent. • Determine the feasibility of inserting technology and/or manufacturing processes into the stockpile and perform benefit and risk analyses. • Develop and deploy innovative business practices, communication tools, and collaboration models to improve NSE agility.	• Conduct multi-discipline studies to understand and assess future weapon concepts for the nuclear stockpile, to include engaging with the DoD to gather insight into their needs. • Determine the feasibility of inserting technology and/or manufacturing processes into the stockpile and perform benefit and risk analyses. • Continue development of innovative business practices, communication tools, and collaboration models to improve NSE agility.	• Initiates the first year of a two-year Non-Ballistic Reentry vehicle Phase 1 (Concept Assessment). • Launches the first year of a two-year Hard and Deeply Buried (HDBT) Phase 1 (Concept Assessment). • Kickstarts a tri-lab (LANL, LLNL, SNL) portfolio of effort for Net Assessments to create an analytical approach to conducting comparative analyses to inform decisions, per NA-1 direction.

Engineering and Integrated Assessments
Aging and Lifetimes

Description

Aging and Lifetimes is responsible for detecting and predicting the onset of harmful aging phenomena in nuclear weapon materials, components, and subsystems before they can degrade the nuclear deterrent. Nuclear weapons contain many materials and components that age in unique and complex ways. Aging and Lifetimes studies these aging phenomena to identify potential aging issues and, if necessary, provide solutions to fix them before degradation can impact the deterrent. Aging and Lifetimes also ensures new materials introduced into the stockpile, whether through life extension programs, modifications, or alterations, will not cause aging problems in the future. These activities require a deep understanding of the material, chemical, metallurgical, physical, and engineering behaviors that control the performance, aging, and degradation of various components in the weapon systems.

To achieve its programmatic goals, Aging and Lifetimes conducts three types of key activities:

- Aging Studies, which provide fundamental materials aging knowledge, support decisions on when to replace weapons components and materials, whether materials can be reused, or if new materials could cause aging issues.
- Computational Modeling, which predicts the impacts of aging on weapon components and materials and provides component and materials lifetime estimates.
- Diagnostic Tool Development, which develops and provides diagnostic tools for improving the quantity and quality of surveillance data for the enduring and future stockpiles.

Aging and Lifetimes activities include:

Non-Nuclear Components – This activity addresses aging related phenomena of non-nuclear components and identifies the highest-risk aging concerns that cross-cut multiple weapon systems. These components perform a wide variety of essential functions and ensure that the nuclear weapon always performs as intended.

High Explosives (HE) in the Nuclear Explosives Package – This activity determines when age-related changes in main charges and boosters may affect weapon safety, performance, and reliability. This is accomplished through a combination of predictive modeling, experimental techniques, non-destructive evaluation tools, and assessment of surveillance data.

Plutonium for Pits – This activity develops and delivers new analytical methods, tools, modeling, and diagnostics, including non-destructive evaluation techniques, to achieve timely, less invasive, and more cost-effective component surveillance.

Canned Subassemblies (CSAs) and Cases – This activity provides experimentally validated material aging models and integrated materials chemistry simulations needed to determine when, or if, CSAs or cases will need to be refurbished or replaced.

Non-Nuclear Materials – This activity identifies and assesses aging of polymeric materials (i.e., potting materials, cushions, pads, adhesives, structural supports, containment vessels for explosives, and detonator cable assemblies).

Systems – This activity augments the existing surveillance program with system-level evaluation diagnostics that include new capabilities to measure component-level parameters during system testing and provide improved confidence in future weapons reliability, safety, and performance.

Highlights of the FY 2024 Budget

- Update and publish annual comprehensive aging and lifetime predictions (APLE Report) used to assess the lifetime of key weapon components.
- Provide timely warning of aging phenomena that threaten the effectiveness of various nuclear weapon systems.
- Develop and provide diagnostic tools for improving effective and efficient stockpile evaluation for the enduring stockpile.
- Complete development and successfully transfer the Active Fast Neutron Inspection and HE Chemistry to the production plants.

- Provide capabilities to assure stockpile modernization efforts do not introduce unacceptable aging risk.
- Support and evaluate accelerated aging tests (designed to determine the response of individual materials to anticipated environmental stressors.
- Provide capabilities for accelerated aging and compatibility tests on relevant combinations and permutations of new and re-used materials.
- Support ongoing CSA aging studies, non-nuclear materials and components studies, and high explosives studies.
- Develop and validate models used to non-destructively assess aging of the stockpile (CSA corrosion, HE aging, polymer aging, etc.).
- Continue supporting the FY 2026 Modern Surveillance Methods Stewardship Capabilities Delivery Schedule (SCDS) pegpost; identify and begin additional projects to modernize the surveillance enterprise.

FY 2025 – FY 2028 Key Milestones
- Explore and develop advanced modeling concepts and non-destructive evaluation to advance weapon surveillance.
- Develop candidate solutions for embedded evaluation of materials and components.
- Develop data analysis methods to discover aging trends and/or signatures using historical surveillance data.
- Enable discoveries in the fundamental science of accelerated aging, identifying new ways to conduct aging leading to shorter timelines and higher confidence.
- Complete transition of the Rapid Gas Analysis technique which will improve efficiency of tritium reservoir function tests in Core Surveillance.
- Complete development of the Shell Acceleration Initiation Train (SAIT) test which improves understanding of high explosives and replace the existing snowball test.
- Continue to update and publish stockpile aging and lifetime assessment reports used to predict aging issues in stockpile components.
- Continue development of new non-destructive diagnostic for transition and deployment to core surveillance,
- Deliver the SCDS FY 2026 Modern Surveillance Methods pegpost with scope jointly developed across the Office of Experimental Science, the Advanced Simulation and Computing Program, the Advanced Manufacturing Development program, the Weapons Technology Development program, and the Office of Stockpile Management.

FY 2022 Accomplishments
- Analyzed tomography data and destructive test data from artificially aged Integrated Response Requirements and fielded prototype of new design.
- Developed finite-element reaction-diffusion simulation codes for unclassified part geometries and compared simulation results to experiments.
- Completed Monte Carlo N-Particle (MCNP) calculations of radiation-environment for new sink material in application environment.
- Completed first measurements of H2 uptake by legacy material at elevated temperatures and in presence of poison/inhibitor gases; included preliminary parameters into legacy material model for uptake performance.
- Performed initial quantum calculations of surface chemistry related to plutonium oxides.
- Developed new hardware and procedures for radiation aging and mechanical testing of adhesive-bonded test joints.
- Conducted experiments to detect and explain underlying mechanisms of atmospheric corrosion initiation, formation/breakdown of corrosion protection layers, and other relevant processes towards the development and improvement of predictive system-level performance models for microelectronics components.
- Conducted experiments and provided data on the physics of adsorption, diffusion, and transport of hydrogen isotopes and helium, and the formation, growth, and rupture of helium bubbles, in materials relevant to the aging of Gas Transfer System reservoirs and other components.
- Discovered and matured fundamental understanding of aging and failure mechanisms of structural materials present in safety critical mechanisms and printed wiring assemblies.
- Continued development of spectrally encoded imaging system used to evaluate dead-zone characteristics of high explosives.
- Developed and demonstrated equipment and methods for producing dimensionally accurate 3D reconstructions of components within a glovebox using photogrammetry.

- Assessed the ability of commercial MRI systems to detect chemical and physical heterogeneities in silicones at a relevant length scale.
- Developed non-destructive evaluation technique for detecting process defects, degradation, and aging of electronic devices.
- Continued development of Prototype Fiber Optic Pit Investigator.
- Performed Acoustic Resonant Spectroscopy data gathering on selected units.
- Continued development of next-generation instrumentation for analysis of aged explosives; developed and implemented chemometric software to extract useful chemical information from aged explosives.
- Fielded first short-term, accelerated radiation aging and compatibility experiments for polymers.
- Performed simulations of moisture diffusion and sorption in ReSorT-Diablo for uncertainty quantification.
- Evaluated alternative, previously unexplored methods of accelerating aging behavior in polymers via pressure and mechanical stress-induced aging.
- Performed outgassing and aging studies on advanced adhesive materials produced using novel manufacturing processes.
- Successfully completed and closed out the FY 2022 Assess Lifetimes and Mitigate Aging SCDS pegpost:
    - Fabricated the first plutonium accelerated aging alloy for future experimental work.
    - Reported final parameters for uranium anodization treatment based on aging, corrosion mitigation, and treatment robustness.
    - Performed full scale system test to understand Methuselah effect; completed mutual peer review; and recommended path forward.
    - Ranked effectiveness of different material modification methods on corrosion resistance.
- Delivered simulation tools and capabilities to enhance methods for early detection of aging in electronic assemblies.

Aging and Lifetimes
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Aging and Lifetimes $87,260,000	**Aging and Lifetimes $59,955,000**	**Aging and Lifetimes -$27,305,000**
• Develop customized Accurate Detonator Advanced Performance Testing (ADAPT) tests and analysis capabilities to investigate holistic detonator performance. • Transition advanced diagnostics, including the Multi Mass Leak Detection tools, the Acoustic Resonance Spectroscopy State-of-Health Analyzer, and the Shell Acceleration Initiation Train (SAIT) to Core Surveillance. • Assess components to inform material and component aging models. • Update and publish aging and lifetime predictions used to assess weapon component lifetimes. • Develop validated understanding of energetic material degradation resulting in corrosion of critical elements in components. • Develop validated understanding to inform predictive models of cracking that lead to loss of hermeticity. • Develop structural response model that enables predictions of degradation caused by embrittlement. • Quantify mechanical degradation in epoxies, encapsulants, and foams in stockpile environments and their effects on surrounding components. • Develop validated capability to inform lifetime estimates of detonators, isolators, and other energetic components. • Complete aging models for high-risk components.	• Revise and publish aging and lifetime predictions used to assess weapon component lifetimes. • Transition advanced diagnostics to core surveillance (Active Fast Neutron Inspection and HE Chemistry). • Mature diagnostic development of the Shell Acceleration Initiation Train (SAIT) test, Magnetic Resonance Imaging (MRI) for polymers, and the Rapid Gas Analysis. • Address aging related phenomena of non-nuclear components and identify highest risk aging concerns. • Assess composition, mechanical properties, contours, and explosive properties of HE due to aging. • Characterize polymer thermal, mechanical, physical, and chemical properties. • Address aging related phenomena of non-nuclear components such as microelectronics, capacitors, switches, cables and connectors, mechanical components, energetic components, and hermetic seals and connectors. • Assess aging of non-nuclear materials including polymers, potting materials, cushions, pads, adhesives, structural supports, containment vessels, and detonator cable assemblies. • Continue refinement of the FY 2026 Modern Surveillance Methods SCDS pegpost; continue ongoing projects and begin new projects that modernize the surveillance enterprise.	• The Request prioritizes efforts aligned to the program of record and preparation for the FY 2026 Modern Surveillance Methods SCDS pegpost.

Engineering and Integrated Assessments
Stockpile Responsiveness

Description
Per Section 3112 of the National Defense Authorization Act for Fiscal Year 2016 (P.L. 114-92), the Stockpile Responsiveness program (SRP) underpins a "nuclear posture that is agile, flexible, and responsive to change" with the purpose of "ensure[ing] the nuclear deterrent of the United States remains safe, secure, reliable, credible, and responsive." The Nuclear Weapons Council has provided SRP program guidance to support stockpile modernization through development of methods to reduce the time and cost to produce nuclear weapons as the overarching priority, while also examining options to address a set of future challenges to the nuclear deterrent. Paralleling this, the House Armed Services Committee Report 116–442 for the FY 2021 NDAA requested that the SRP direct efforts to the challenge of "production responsiveness" to meet accelerated production requirements for modernization, as contrasted with the program to maintain the present stockpile.

Consequently, NNSA executes the SRP as a science, engineering, and technology program to exercise and enhance capabilities to proceed rapidly from clean sheet designs through prototyping, testing, and development for production and qualification, including the rapid execution of hydrotests, flight tests, and environmental tests. The program especially pursues new production and qualification techniques to dramatically accelerate the rate at which qualified components can be produced, while reducing costs and complexity. SRP emphasizes technology that improves system performance, including safety, surety, feasibility, cost, and time to produce and qualify the system.

In the conduct of its activities, SRP is guided by its statutory objectives to exercise and enhance capabilities required to support all phases of the joint nuclear weapons lifecycle process, to transfer knowledge and skills to the newer generation of nuclear weapon designers and engineers, and to strengthen integration between DoD and NNSA. A significant emphasis of the SRP is on laboratory-production plant collaborations focused on augmenting production responsiveness. The three nuclear weapon laboratories (LANL, LLNL, and SNL) are designated as design agencies (DAs), while the production plants (Pantex and Y-12, KCNSC, and SRS) are designated as production agencies (PAs). LANL and SNL have the unique distinction of holding a PA and DA designation because of their production mission responsibility for select components.

SRP activities are undertaken with the view that modernization and other potential responses to future challenges will require reinvigorating the development process for new systems or subsystems employing new technologies and materials. Such development necessarily invokes increased technical risk beyond the limited risk presently accepted in LEP planning. To enhance capabilities to address this risk, SRP program activities described below are chosen in part to demonstrate the ability to accelerate the design, prototype, test cycle to decrease the time and cost to develop a producible and qualifiable design.

Stockpile Responsiveness activities include:
Acceleration of the Nuclear Weapons Development Lifecycle and Reduction of Costs – The highest priority identified by the NWC and Congress is for SRP is to examine alternative approaches to design, manufacturing, certification, and qualification to accelerate the timeline for the nuclear weapons lifecycle and reduce costs. Because the SRP lies expressly outside the acquisition process, the SRP can take risks without impacting planned LEPs or detracting from confidence in the present stockpile. It can demonstrate the potential for alternative processes and materials to deliver nuclear weapons components and systems rapidly.

Analysis of Emerging Threats and Technology Challenges and Opportunities – This is a small, but important effort to use laboratory technical expertise to analyze the consequences of emerging threats, to project technology trends, and to understand the implications for our deterrent on time scales consistent with the lifecycle of stockpile systems, which can greatly exceed the time horizon of Intelligence Community analyses. This effort supports ad hoc technical teams assembled to conduct rapid analyses of issues and scenarios and supports analyses executed on behalf of the Combatant Commands, principally U.S. Strategic Command.

Challenge Problems – Significant one-year to multi-year, multi-site efforts to exercise integrated nuclear weapons design capabilities against potential future threats. These look at problems beyond the time frame of nuclear weapons acquisition activities to explore design for manufacturability and the certification and qualification challenges presented in such designs. These problems set a systems context for exploring manufacturing, prototyping, and testing issues. To date, NNSA, with the concurrence of the DoD, has focused on two challenges: strategic deep underground target defeat and defended target defeat. They further reinvigorate the ability to design and develop integrated systems using new technologies and capabilities and provide the next-generation experience in the trade-offs needed for design optimization.

Prototyping, Testing, and Flight Testing – Providing the next generation of designers and engineers hands-on experience in system development, achieved through exercising and accelerating the design, build, test cycle to overcome the technical risk in new technology development. This includes building and testing of non-nuclear prototypes of engineered systems and components, including accelerated hydrotest, environmental testing and flight tests of non-nuclear prototypes. The program is exploring the use of commercial launch providers who build the missile and take responsibility for range operations to develop and demonstrate low-cost, high tempo flight testing to accelerate the development of systems dependent upon new technologies, configurations, and materials. A key goal of this activity is providing junior staff experience in the process of turning ideas into a working system.

Highlights of the FY 2024 Budget

- Continue to foster design agency/production agency (DA/PA) collaboration efforts to develop responsive manufacturing and qualification processes.
  - Continue maturing advanced manufacturing technologies along with on-machine metrology and inspection methodologies to accelerate production and qualification.
  - Continue deploying digital collaboration and digital engineering tools complex-wide.
  - Exercise design for manufacturability in a collaboration between design and production agencies on a prototype system inserting new manufacturing technologies in the production complex that can shorten the production timelines and costs of capabilities needed for modernization. Examine concepts such as spiral development to improve responsiveness of the design and manufacturing lifecycle.
  - Demonstrate performance and insensitivity of new energetics to allow qualification as IHE.
  - Prototype and document processes for system acceleration, including model-based engineering, model-based system engineering, and design-agency/production-agency hardware prototyping and manufacturing acceleration.
- Mature technologies identified in the design competition outlined in the FY 2018 NDAA for a potential future strategic missile warhead, exploring different manufacturing approaches and stockpile-to-target sequence environments compared to today's systems.
  - Complete assembly of defended-target delivery vehicle prototype with integrated non-nuclear warhead componentry and collect system ground-qualification test data to support a future flight test.
- Complete execution and analysis of experiments to support strategic deep underground target defeat, including Davis-Gun and hypersonic sled-track tests.
  - Use the hypersonic sled-track test in collaboration with Delivery Environments to demonstrate an accelerated testing methodology developed in collaboration with Department of Defense facilities. This capability development lowers the cost, schedule, and technology risks for future tests are planned for the stockpile modernization program.
  - Complete Davis Gun tests Energetic Materials Research and Testing Center (EMRTC, Socorro, NM) to reestablish a vital capability for severe mechanical environments, validate simulations of penetrator mechanics, demonstrate novel shock mitigation technologies, and analyze novel concepts for mechanical hardening of components.
- Complete reporting on the Rapid Prototype Cycle pegpost to build a non-war-reserve prototype and develop tools to improve cross-site collaboration in areas like digital engineering.
- Continue to demonstrate commercial flight test capabilities to provide high tempo, high fidelity flight testing for system development.

FY 2025 – FY 2028 Key Milestones

- Use DA/PA collaboration to demonstrate the ability to progress from a clean sheet design through demonstration prototype in two years to include hydrotesting, flight testing, and environmental testing using digital engineering.

- Explore new manufacturing techniques and process improvements leading to a more agile and responsiveness production facility.
  - Deploy digital twin technology for manufacturing machines to shorten production process development.
  - Implement demonstrated machine learning technologies to optimize and accelerate design phase.
  - Continue deployment of responsive production technologies and develop associated designs optimized for manufacturing.
  - Develop and demonstrate a framework for weapon development that reduces to the minimum high-cost integrated system testing for certification by leveraging modeling capabilities.
  - Prove out the design methodology, manufacturing strategy, processes, and cost requirements to implement a spiral development approach.
- Work in partnership with DoD stakeholders to develop and demonstrate system analysis capabilities that can enhance the Nation's nuclear deterrent.
- Use the prototype spiral development approach to demonstrate the ability and explore challenges to achieve cost effectiveness in design and production with respect to the program of record.
- Continue to demonstrate an accelerated design/build/test cycle to increase the speed of learning in developing, adapting, and integrating new technologies.
- Continue to explore methods to reduce time, cost, and footprints for product qualification.
- Deliver the FY 2026 SCDS Preparedness Exercise pegpost that will exercise joint design and production agency personnel in pursuit of shorter warhead development timelines.

FY 2022 Accomplishments

- In support of production responsiveness, SRP fully integrated the production plants into the SRP program to explore issues from design for manufacturability to specific production processes and improved methods for qualification.
  - Completed the installation and commissioned an Electron Beam Cold Hearth Melting system for production of binary material and transitioned this project to NA-19 for further development for production.
  - Explored potential new materials and manufacturing capabilities that could shorten the delivery of long lead time components for stockpile systems.
  - Designed, fabricated, and tested the first iteration of prototype hardware that could be leveraged for multiple applications.
  - Deployed complex-wide digital collaboration tools to accelerate data exchange and speedup collaboration between design and production agencies.
- Established a program to demonstrate commercial launch services to provide low-cost, high tempo flight testing required to integrate modern technologies, configurations and materials into systems required under stockpile modernization. The first launch was from Spaceport, NM, to White Sands Missile Range and integrated a LANL test RV with an Up Aerospace missile with the successful collection of inflight data through a LANL Cubesat.
- Completed the NWC task on Hard and Deeply Buried Targets (HDBT) defeat by examining a wide range of design options that could be mated to potential DoD delivery systems.
- Contributed to the development of the next generation of leaders by using young and mid-career technical staff to lead design teams and technology development teams. Training early and mid-career individuals, the program exercised processes to manage work with DoD organizations to explore alternatives to address future challenges to the deterrent.
- Performed hypersonic reverse ballistics testing at the Arnold Engineering Development Complex (AEDC) at Arnold AFB, along with several other small-scale tests, in preparation for an upcoming full-scale hypersonic sled track test.
- Reinvigorated DOE reentry vehicle prototyping capability enabling earlier execution of integrated component certification activities and system-level safety tests.

Stockpile Responsiveness
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Stockpile Responsiveness $63,742,000	**Stockpile Responsiveness $69,882,000**	**Stockpile Responsiveness +$6,140,000**
• Provide the younger generation of designers and engineers with experience in developing rapid solutions to stockpile system issues by developing and employing modern technologies and methods and performing tests to prove out the solutions. • Continue DA/PA efforts to develop advanced manufacturing and production technologies that can accelerate the delivery of long lead time materials and components needed for testing and system development. • Develop high tempo hydrotesting, flight testing, and environmental testing capabilities. • Support analyzing and developing approaches to addressing high priority future threat scenarios in consultation with the Department of Defense. • Deliver the SCDS FY 2023 Rapid Prototype Cycle pegpost that will build a non-war-reserve prototype and develop tools to improve cross-site collaboration in areas like digital engineering. • Develop alternative approaches to qualification and acceptance testing that can reduce costs and time frames as well as laboratory and production facility resources.	• Continue deploying digital collaboration and digital engineering tools complex-wide to overcome challenges without disruption current programmatic activities. • Complete execution and analysis of experiments to support strategic deep underground target defeat. • Exercise design for manufacturability in a collaboration between design and production agencies on a prototype system inserting new manufacturing technologies. • Initiate prototype spiral development approach to exercise the process and explore currently unidentified challenges. • Demonstrate performance and insensitivity of new energetics. • Improve high tempo flight testing to meet needs for responsive relevant environment test platform.	• The increase provides further design agency / production agency collaborations to accelerate production and qualification of nuclear components and material including exercising digital engineering methods for prototype production. • SRP will also focus on the demonstration and exercise of accelerated testing capabilities to reduce time and cost for development, certification, and qualification. • For additional detail, refer to the accompanying Stockpile Responsiveness Program annual report.

Engineering and Integrated Assessments
Advanced Certification and Qualification

Description

Advanced Certification and Qualification (ACQ) develops tools and methods to ensure there is a certification path for stockpile systems and components in the absence of additional nuclear explosive testing by integrating computing, science, technology, and engineering advancements to facilitate certification of future life extension programs (LEPs) and other warhead needs. Additionally, ACQ, in collaboration with Advanced Manufacturing Development and the Stockpile Responsiveness program (SRP), explores emerging methods to accelerate the qualification of components and manufacturing processes and reduce costs and laboratory and plant facility requirements. In support of modernization initiatives, ACQ has moved from understanding the certification basis for the legacy stockpile to developing certification methodologies for the stockpile as it is evolving, including planned LEPs and modern systems needed in the future. ACQ is exploring the qualification benefits and challenges of modular architectures proposed for future stockpile systems.

More specifically, Advanced Certification and Qualification: (1) develops certification methodologies and integrates new experimental data into common models and assesses any impacts on stockpile performance, (2) develops certification and qualification paths for advanced manufacturing and replacement materials, (3) conducts certification readiness exercises in partnership with other programs to explore certification and qualification challenges in technologies that are being developed or demonstrated for future LEPs, and (4) explores the certification challenges of advanced surety technologies.

ACQ provided funding for Kansas City Nuclear Security Campus (KCNSC), Y-12, and Pantex to develop qualification methodologies for advanced manufacturing methods to decrease the time invested in the qualification process.

Highlights of the FY 2024 Budget

- Develop certification approaches for systems and components responsive to stockpile modernization initiatives in order to strengthen the certification basis for the new designs of modern weapons.
- Develop capabilities to enable assessment and qualification of designs that enable agility to meet emerging threats and changing environmental requirements.
- Develop approaches to accelerate and streamline qualification efforts for new manufacturing methods, materials, and components to reduce time and costs to introduce into the stockpile and to address and manage the inherent technical risk in new approaches to shorten the delivery schedules of upcoming programs of record.
- Continue a certification readiness exercise to assess the qualification readiness of proposed modular architectures to improve the flexibility and maintainability of stockpile systems and reduce lifecycle costs in order to extend the functional life of the future deterrent.
- Execute hydrodynamic tests to support improved technologies, raise TRLs and MRLs, and demonstrate certifiability.
- Continue to assess the archive of nuclear tests, study of failure modes, and other advanced methods to expand in certification basis of upcoming sustainment programs and for future weapon systems.
- Develop understanding of scaling and surrogacy to support the experimental basis for weapon assessments.
- Conduct experiments supporting product-based qualification methods of components made with advanced manufacturing to not be tied to material and process limitations.
- Exercise the certifiability of reuse, surety, and hardening concepts, as well as concepts incorporating new manufacturing technologies.
- Develop Advanced Materials qualification methodology to enable component material replacement options with a qualification path to reduce production time constraints.
- Advance microstructure-aware simulation capability and deploy production codes for designers to span micro- to macro-scale behaviors.
- Assess new options and materials and manufacturing techniques for thermal protection systems and develop qualification methodologies to support identified needs for modern deterrents.
- Develop and mature the common qualified testers improving flexibility to support future products, reducing long development, build, and qualification cycles with maximum reuse of pre-qualified software and hardware.
- Develop new inspection techniques to validate and certify new complex geometries produced by advanced manufacturing techniques.

- Continue building on the NNSA 2025 Vision for an Assured Nuclear Enterprise.

FY 2025 – FY 2028 Key Milestones

- Continue to develop an understanding of the impacts of stockpile modernization requirements on certification and qualification methodologies and develop responses to those impacts.
- Perform hydrotests to understand the scaling of performance with dimensions in IHE systems.
- Perform hydrotests to certify PBX9701 and X-0298 high explosive performance to maintain options for future weapon systems.
- Continue planning for asurrogate hydro test for the upcoming Excalibur E subcritical experiment to be conducted inr the ECSE facility.
- Advance the machine learning toolkit for certification and qualification.
- Develop a certification strategy for non-standard secondaries.
- Establish certification strategies for non-standard primaries, including hydros.
- Perform flight test qualification of NNSA and Air Force Research Laboratory concepts using ReDX commercial platform.
- Define performance-based requirements for major materials and components produced at the plants to improve manufacturability.
- Develop and implement common testing and qualification methodologies at the design agencies and the production plants wherever achievable to reduce redundancy and optimize resources.
- Define the design space envelope with high confidence for certification to speed up design timelines, and lower development risks for future weapon systems.
- Support qualification efforts for advanced materials.
- Define qualification methodologies for new thermal protection system materials.
- Support qualification of additively manufactured, topologically optimized brackets and supporting structures and qualification methodologies for these materials in non-destructive applications.
- At production plants, develop common testers for qualification and mature model-based product acceptance methods.
- Develop methods to qualify builds of complex geometric structures.

FY 2022 Accomplishments

- Initiated DA/PA collaborations to accelerate and improve qualification methodologies.
- Supported a JASON letter study and subsequent full study of the impact of stockpile modernization requirements on the principal certification methodology QMU (quantification of margins and uncertainties). This study also reviewed prospective plans for the use of the ECSE facility under construction at NNSS including Neutron Diagnosed Subcritical Experiments to address certification challenges.
- Developed in-situ inspection technologies to accelerate production rates and yields and reduce qualification testing for new manufacturing technologies, including additive manufacturing of metals and high explosives.
- Completed thermomechanical shock experiments on advanced materials.
- Developed experimentally validated meso-scale simulation capability for AM materials and components.
- Built capability for development and testing of advanced thermal protection system materials.
- Completed a hydro test in support of the Joint Technology Demonstrator (JTD).
- Developed methods for additively manufactured, structured, high explosives including development of an additively manufactured plane-wave generator.
- Completed development of diagnostics techniques to improve data collection from subcritical experiments.
- Completed gas-gun experiments in support of advanced surety solutions.
- Successfully executed a “blind test” of methodologies to define key performance characteristics from subcritical experiments.
- Performed key experiments for certification of optically initiated detonators including demonstration of equivalence of performance with traditional detonation processes.
- Designed an experiment for the resolution of a neutron reactivity anomaly.
- Determined that PBX9501 does not undergo DDT (deflagration to detonation transition) for Weapons Response Initiative (WRI) applications. Included in Pantex safety basis via CASTLE.

- Performed direct light PBX9701 “furball” experiments using commercial chip-slapper detonators to demonstrate performance of this new high performance insensitive high-explosive.
- Performed MEDUSA series of PBX9701 experiments on pRad, including an arc geometry experiment.
- Designed (with LLNL) a brand-new Nuclear Explosive Package for use in the Agile Processes and Technology (APT) demonstrator that was designed for certifiability and manufacturability.
- Sponsored (with DE) integration exercises with AFRL.
- Executed hydro test in support of ECSE technology development.
- Matured the ability to perform acceptance testing using model-based product definition.
- Strengthened and improved nuclear enterprise assurance inspection techniques.
- Installed inline inspection equipment to monitor in-process build quality.
- Performed ODIN’S TESSERACT experiment on pRad, to support qualification of new detonator designs and inform certification.
- Supported the use of lean product development and digital engineering for prototype development and production in support of the FY 2023 SCDS Rapid Prototyping Cycle Pegpost.

Advanced Certification and Qualification
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Advanced Certification and Qualification $58,104,000	**Advanced Certification and Qualification $59,134,000**	**Advanced Certification and Qualification +$1,030,000**
• Address impacts of stockpile modernization on certification and qualification methodologies. • Continue DA/PA collaborations to accelerate qualification processes and methods for new materials and manufacturing processes. • Execute hydrotesting in support of the development of certification and qualification methods. • Complete a certification readiness exercise to assess the qualification readiness of proposed modular architectures to improve the flexibility and maintainability of stockpile systems and reduce lifecycle costs. • Develop understanding of scaling and surrogacy to support the experimental basis for weapon assessments. • Conduct experiments supporting product-based certification methods of components made with advanced manufacturing. • Develop Advanced Materials qualification methodology to enable component material replacement options. • Assess new options and materials and manufacturing techniques for thermal protection systems and develop qualification methodologies. • Mature the common qualified testers initiative.	• Define qualification methodologies for new thermal protection system material. • Execute hydro testing to meet the pace demanded by advanced certification needs. • Assess the archive of nuclear tests, study of failure modes, and other advanced methods to expand certification capability. • Develop and mature common qualified testers improving flexibility and reducing downtime in production. • Conduct experiments supporting product-based certification methods of components made with advanced manufacturing methods. • Assess the qualification readiness of proposed modular architectures.	• The increase supports additional effort on addressing the qualification of new technologies developed under Weapon Technology and Materials Maturation with priority on technologies considered for insertion in the W93 and future systems.

Stockpile Research, Technology, and Engineering
Inertial Confinement Fusion

Overview

The Inertial Confinement Fusion (ICF) program provides high energy density (HED) science capabilities and expertise that support research and testing across the breadth of the Stockpile Stewardship Program. Its two-fold mission is to meet immediate and emerging HED science needs to support the deterrent of today, and to advance the R&D capabilities necessary to meet those needs for the deterrent of the future. The ICF program enables access to and study of the HED regime through (1) the design and execution of complex physics experiments to improve our fundamental science understanding, (2) the development of instrumentation to diagnose physics phenomena at the extreme temperature, pressure, and density conditions relevant to nuclear weapons performance, and (3) the development and operation of experimental facilities capable of reaching those conditions. The ICF program's flagship facilities, the NIF at LLNL, Z at SNL, and Omega at the University of Rochester's Laboratory for Laser Energetics (LLE), represent a complementary set of capabilities designed to meet the diverse needs of weapons physics, the pursuit of ignition, and the exploration of fundamental HED science.

Since most of the energy in a nuclear weapon is generated by matter in HED conditions, understanding the behavior of matter and energy in the HED regime is critical to understanding and predicting the performance of both nuclear weapon primaries and secondaries, as well as the response of weapon components to extreme hostile radiation environments. The ICF program leverages its experimental design expertise and computational modeling capabilities, diagnostic technology, target engineering and fabrication infrastructure, and national HED facilities to ensure high fidelity experimental capabilities and data are available to support a range of NNSA missions. Its capabilities are used by partner programs to assess and certify the existing stockpile, inform design decisions for current life extension programs, investigate hostile nuclear environments, and support research by DoD and key international partners. The program represents the only experimental option available to address many of the weapon-relevant HED science challenges without resuming underground explosive nuclear testing.

The ICF program supports NNSA's long-term R&D mission by developing the knowledge and capabilities necessary to reach controlled thermonuclear fusion in the laboratory. Reaching a burning plasma platform and eventually producing high fusion yield will open the door to a range of important weapons physics that have been unreachable since the cessation of underground explosive nuclear testing. This is among NNSA's most high technical risk, high reward research efforts. Not only does it attract and challenge some of the nation's best physicists and engineers to the complex, but it also represents an important component of NNSA's preparation to meet the stockpile science challenges of the 2030s and beyond.

Additionally, NNSA recognizes the important national interests in fusion energy and supports initiatives in development through collaborative work in specific areas of common interest with the NNSA stockpile stewardship mission. Our investment in the knowledge and facility capabilities of inertial confinement fusion underpin broader Departmental efforts in inertial fusion energy (IFE). On December 5, 2022, LLNL's controlled fusion experiment surpassed the fusion threshold by delivering 2.05 megajoules (MJ) of energy to the target, resulting in 3.15 MJ of fusion energy output, demonstrating for the first time a most fundamental science basis for IFE. This result accelerates the pursuit of high-yield platforms to address issues relevant to nuclear weapon outputs, environments, and effects. As such, the ICF Program is focused on:

- Addressing key gaps and uncertainties in fundamental physics understanding of fusion target performance.
- Conducting research activities to improve quality of existing targets and explore new target designs to achieve higher yield.
- Achieving a dependable, repeatable output and development of yield applications relevant to nuclear weapon outputs, environments, and effects.
- Maintaining the technical leadership and capabilities necessary to recruit, train, challenge, and retain the highest caliber of scientists and engineers at all three national HED facilities to engage in stockpile stewardship and to pursue world-leading research.

- Exploring innovative and disruptive target designs, diagnostics, drivers, and other specialized technologies, simulation capabilities, and analytical tools to maintain leadership, challenge program scientists, and advance physics understanding to support the priorities of stockpile stewardship.
- Promoting cross-laboratory collaboration and external engagement to improve program efficiencies and ensure continued global leadership.
- Acquiring information at the current scales to inform cost, scope, and schedule for any future experimental capability investments.

The FY 2024 Budget Request supports research and operations at NNSA's preeminent HED facilities, with research efforts focused on 1) maturing HED stockpile science concepts and platforms in support of the broader NNSA portfolio and 2) advancing ignition and burning plasma science to access weapon physics conditions robustly. Emphasis continues on extending the lifetime of these facilities, to include making progress on previously backlogged maintenance. NNSA's investment in facility sustainment activities will reduce the risk to the operational cadence and experimental accessibility at NIF, Z, and Omega.

The ICF program is made up of three subprograms:

1. **HED and Ignition Science for Stockpile Applications** develops and matures the tools to enable partner programs to investigate weapons physics phenomena for near-term applications and pursues controlled thermonuclear fusion to meet next-generation stockpile science needs.
2. **ICF Diagnostics and Instrumentation** establishes new diagnostic capabilities and experimental support systems through the research and development of specialized technologies necessary to execute experiments studying matter under extreme HED conditions.
3. **Facility Operations** provides the support and services required to ensure the safe and efficient operations of the national HED facilities, including operations, preventative and backlogged maintenance, load and target consumables, and the research and engineering to sustain facility capabilities.

Inertial Confinement Fusion
HED and Ignition Science for Stockpile Applications

Description
This subprogram supports R&D in high energy density (HED) physics, including the study of thermonuclear fusion. In the HED state, materials experience pressures greater than one million earth atmospheres and reach temperatures and densities far exceeding those of normal or condensed matter, generating complicated behaviors predominantly described by plasma physics. This complex and dynamic state dominates energy generation in nuclear weapons, making its study a key component of the Stockpile Stewardship Program (SSP). The research supported in this subprogram develops and matures the tools that enable partner programs to investigate dynamic material properties, fluid and plasma hydrodynamics, hydrodynamic instability-induced mix, burn, boost, radiation transport and opacities, and yield applications relevant to nuclear weapon outputs, environments, and effects. This collection of capabilities, in combination with the national HED facilities and enabling diagnostics, provides NNSA's only access to many of these phenomena outside of underground nuclear testing.

This subprogram coordinates closely with the Assessment Science and nuclear modernization programs to conceive, mature, and provide platforms to execute experiments at all the national HED facilities to meet the near-term requirements of stockpile stewardship. These tools provide access to materials data at extreme conditions, allow the study of hostile radiation environments, and make it possible for NNSA, Department of Defense users, and key international partners to probe a variety of complex weapons physics phenomena in the absence of underground nuclear testing.

This subprogram's long-term focus is on R&D to achieve ignition, a burning plasma platform, and ultimately high fusion yield in the laboratory. When realized, these will provide a set of capabilities critical to the long-term viability of the SSP — particularly, the future qualification of nuclear components, the assessment and certification of the next generation of nuclear weapons in the full range of relevant HED regimes, and the investigation of a range of complex physics that has been out of experimental reach since the cessation of underground nuclear testing. HED and Ignition Science for Stockpile Applications pursues these capabilities through theory, experiments, modeling, design, and engineering. As part of this long-term effort, this subprogram includes three distinct approaches to ignition: laser indirect drive, laser direct drive, and magnetic direct drive. These approaches provide complementary physics insights and diversified technical risks, making use of the unique capabilities of each HED facility in the ICF portfolio.

In support of these short- and long-term efforts, this subprogram develops focused modeling capabilities and analytical methods to improve its predictive capability and maximize its use of experimental data across all mission areas. It also continues to explore and improve its ability to couple driver energy to targets in all experimental configurations to maximize the fidelity of weapons physics experiments and continue to improve the performance of integrated fusion experiments.

The December 2022 NIF experiment exceeded current predictions and achieved a historic milestone by generating more fusion energy out (3.15 MJ) than laser energy used to drive it (2.05 MJ). This subprogram will continue to study the burning fusion plasma regime, advance understanding of nuclear ignition, and develop robust platforms for yield applications relevant to nuclear weapon outputs, environments, and effects. This goal is a cornerstone of the program, which is broadly focused on resolving key gaps in physics understanding and acquiring information at the current scales to justify cost, scope, and schedule for any future investments in experimental capability and pursuing world-leading research that attracts early-career scientists and engineers to all three national HED facilities. In FY 2024, this subprogram will continue to implement some high priority findings and recommendations from both studies to optimize its contributions to SSP and its progress toward dependable, repeatable platforms for yield applications.

Highlights of the FY 2024 Budget

- Maturing experimental platforms to execute highest-priority HED experiments critical to supporting stockpile needs, including the generation of intense sources of x-rays and neutrons for survivability studies and the development of high-fidelity approaches to experimentally characterize materials at high pressure.
  - Fusion Yield Platforms (FYP): fundamental understanding and advancement of fusion performance; enable future access to nuclear weapon-relevant regimes.
  - Assessment Platforms (ASP): leverage FYP innovation for modernization, assessment science, and survivability; platforms for material properties, radiation sources, hydro, nuclear physics.
  - Simulation and Analysis Methods (SAM): improve predictive capability and maximize return on experimental investment across HED science; integrated ICF design, AI, data analysis, focused models.
  - Driver Physics (DP): Provide future stewards access to and control of a wider range of NW-relevant experimental regimes.
- Strengthening the foundations of experimental science to support stockpile stewardship:
  - Renewing emphasis on the fundamental physics of ignition.
  - Balancing inclusion of innovative and disruptive research across the program.
  - Demonstrating improved compression in laser-driven targets.
  - Advancing ability to understand and predict driver-target coupling through focused physics experiments and improved modeling.
  - Developing understanding and planning for a future high yield capability.

FY 2025 – FY 2028 Key Milestones

- Refine requirements for magnetic direct drive paths to high yield and volume burn (FY 2025).
- Mature platforms for investigation of dynamic material properties (FY 2025).
- Assess prospects for high yield (100 MJ+) with laser indirect drive at the NIF (FY 2026).
- Conduct technical assessment of volume burn platforms on current and future facilities (FY 2026).
- Experimentally test combined threats (FY 2027).
- Demonstrate next-gen pulsed power technology (FY 2027).
- Determine the limit of implosion efficiency in direct drive on OMEGA (FY 2027).
- Experimentally assess 10 MJ class platform on NIF (FY 2027).
- Test innovative magnetic direct drive (MDD) configurations to reduce uncertainty on paths to high yield (FY 2028).
- Assess next-gen laser architectures for stockpile stewardship applications (FY 2028).

FY 2022 Accomplishments

- Completed a NIF double shell dynamic radiography experiment in November 2021 using the advanced radiographic capability (ARC), observing the first images of the double shell implosion. This work supports the ICF mission of developing robust burning ignition platforms for stockpile stewardship.
- Completed a set of four deuterium-tritium (DT) layered experiments to assess the variability in the 1 MJ yield regime.
- Developed analysis technique to inform scaling of magnetic direct drive targets to next-generation pulsed power capability.
- Achieved record neutron yield from DT targets on NIF, demonstrating increased capsule absorbed energy and symmetry control. Ongoing work will build on this new design class to further improve efficiency and performance.
- Created an improved deuterium/deuterium-tritium (D2/DT) first-principles equation-of-state (iFPEOS) table using the latest developments in first-principles methodology. The methodology gives better EOS description for D2/DT in good agreement with shock Hugoniot and sound-speed experiments at pressures less than 200 Gigapascals.
- Studied stagnation and implosion performance indicators at Omega, which drove improvement of radiation modeling and better reproduction of experimental density profiles, key to both Laser Direct Drive (LDD) and Laser Indirect Drive (LID).
- Employed new experimental platforms at Omega to experimentally confirm longstanding theory of laser-plasma instabilities; these insights will make it possible to improve energy coupling and control of future ICF implosions.

HED and Ignition Science for Stockpile Applications
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
HED and Ignition Science for Stockpile Applications $114,722,000	**HED and Ignition Science for Stockpile Applications $110,269,000**	**HED and Ignition Science for Stockpile Applications -$4,453,000**
• Advance understanding in key areas of megajoule yield and burning plasma science. • Resolve uncertainties in laser-driven target performance variability. • Explore portion of the design space for laser-driven targets with alternative target drive approaches.	• Complete quantitative assessment plan for double shell evaluation. • Complete Radiation Trapping Experiments to determine efficiency for minimizing losses for high-Z pusher designs. • Complete multi-shock validation of BHR. • Establish an approach for determining the generalized Lawson Criteria from experimental measurements of MDD implosions on Z and apply for a representative range of target types and input conditions. • Perform Sierra experiments over a range of input conditions to demonstrate influence on stagnation temperature or rho-r. Diagnose conditions and compare to simulations.	• Decrease represents reprioritization of resources to support higher priority NNSA programmatic efforts while balancing HED and ignition science experimental activities necessary to deliver on current needs and future capabilities within stockpile stewardship.

Inertial Confinement Fusion
ICF Diagnostics and Instrumentation

Description

The Inertial Confinement Fusion (ICF) Diagnostics and Instrumentation subprogram establishes new diagnostic capabilities and experimental support systems at the three national high energy density (HED) facilities through the research and development of specialized technologies necessary to execute experiments studying matter under extreme HED conditions. Diagnostics developed within this subprogram underpin the scientific advances made in support of all HED experimental application areas, including Assessment Science (AS), nuclear survivability, and the pursuit of high fusion yield. They provide the key link between facility generation of HED conditions and the use of experimental data to validate models and resolve weapons physics issues. Improvements in diagnostic performance enable the extraction of essential physics phenomena of interest from complex and dynamic experiments. Recent investments in this subprogram have provided unprecedented experimental fidelity in the HED regime, allowing more useful information to be gained from each experiment, which is used by Assessment Science, Advanced Simulation and Computing, Stockpile Management, and other stockpile programs, for successful execution of their respective Stockpile Stewardship and Management Plan responsibilities.

Priority activities across this subprogram include: advancing new technologies through design and engineering of transformational diagnostics that provide unprecedented information from HED experiments and can be used across the HED facilities; fielding diagnostics based on known technologies to address local needs and to achieve programmatic deliverables at each HED facility; and meeting HED experimental requirements through new experimental capabilities and operationally efficient support systems. Efforts to advance these activities also include development of experimental platforms that expand the performance range of the advanced laser- and pulsed-power facilities, new cryogenics capabilities such as improved handling and positioning systems or improved control layer quality systems, and new experimental capabilities such as improved laser diagnostics for accuracy or beam balancing. Many of these developments, particularly the transformational diagnostics, are advanced through coordinating efforts and sharing expertise across the HED facilities.

Highlights of the FY 2024 Budget

- Research and develop highest-priority transformational diagnostics (as detailed in the National Diagnostics Plan for HED Science) at the three national HED facilities to improve the fidelity of data for studying physical phenomena relevant to stockpile work and supporting predictive modeling, specifically:
  - Field improved high resolution one-dimensional VISAR and a time resolved x-ray diffraction platform at NIF for equation of state (EOS) measurements of Pu; research high resolution velocimetry at Omega.
  - Implement improved equatorial line-of-sight down-scatter neutron and gamma imaging at NIF to better understand compression; develop polar line-of-sight neutron imaging system for NIF.
  - Complete final design review for time resolved neutron spectroscopy diagnostic for NIF to better understand compression and coupling around stagnation.
  - Develop next generation hybrid CMOS sensors and high energy detectors for NIF, Z, and Omega; improve diagnostics (spectroscopy and time resolved diffraction) with use of hybrid CMOS sensors at NIF and Omega.
  - Performance qualify the third line of sight hot-spot x-ray imager at Omega for exploring symmetry and hot-spot formation.
- Improve, field, and maintain key required local diagnostics and associated support systems to effectively execute experimental activities by capturing key data that will validate physics codes and reduce uncertainties in assessing nuclear weapons performance. This includes development of:
  - Extended x-ray absorption fine structure (EXAFS) diagnostic for Pu EOS measurement on NIF.
  - Neutron time of flight and x-ray streak diagnostics for Z for measurements around stagnation.
  - Time resolved ultrafast x-ray imager for Z to measure evolution of plasma parameters.
  - Gaseous radiochemistry diagnostic for double shell target measurements on NIF.
  - High-dynamic range/high-sensitivity gamma reaction history for ICF and AS measurements at Z.
  - Through-foil x-ray radiography platform using Fresnel Zone plate imager with monochromator at Omega.
  - Two-dimensional VISAR optimization for laser imprint measurements at Omega.
  - Particle and x-ray time-resolved diagnostic optimization for hot-spot x-ray emission measurements at Omega.

- Develop new experimental capabilities and diagnostic support systems to include:
  - Cryogenic magnetic field hohlraum platform for ICF implosions on the NIF.
  - Advanced cryogenic and gas-filled system configurations for ICF and Assessment Science platforms on Z.
  - Foam-coated implosion targets using additive manufacturing to mitigate laser imprint at Omega.
  - Next generation magneto-inertial fusion electrical discharge system (MIFEDS) fabrication for Omega.

FY 2025 – FY 2028 Key Milestones

- Develop and deploy transformational diagnostics, according to the National Diagnostics Plan, which will help acquire unprecedented information related to materials data, complex hydrodynamics, radiation flow and effects, and thermonuclear burn physics data.
- Develop and deploy local diagnostics as well as their associated analysis packages that can operate in harsh HED environments necessary in understanding radiation physics and the behavior of matter in the HED regime that are critical to predicting the performance of nuclear weapons and understanding both primary and secondary nuclear weapon physics.
- Develop and deploy new experimental capabilities and diagnostic support systems that provide improved efficiency and better performance.
- Collaborate between NIF and Z to deploy additional diagnostics on Z fully utilizing the capabilities of their pulsed power system.

FY 2022 Accomplishments

- Completed a neutron radiochemistry shot for diagnostic development within double shell experiments on NIF.
- Successfully collected EXAFS data on lead and tantalum L shell experiments at NIF using a novel crystal spectrometer showing dramatic improvement in energy resolution and total throughput compared with traditional designs (in conjunction with DMP and HED&IS).
- Successfully collected the first ion acoustic wave data from a NIF target using the optical Thomson scattering system and made the first successful measurement the vacuum-ultra-violet background self-emission spectrum from a hohlraum target.
- Obtained the first physics data (electron temperature temporal history of an ICF hot spot) using a new time-resolved continuum spectrometer diagnostic at NIF.
- Observed complete time history of a phase transition in lead with best-quality to date from time-resolved x-ray diffraction diagnostic at NIF (in conjunction with HED&IS).
- Completed target-diagnostic system reconfigurations at NIF for measurements of ICF implosions and hohlraum science.
- Obtained first time-resolved absorption spectra with ultrafast x-ray imagers to determine time-resolved opacity of a material (in conjunction with SAT).
- Designed and calibrated a new compact recoil spectrometer to measure the primary fusion yield and areal density of magnetized liner inertial fusion experiments on Z (in conjunction with PAT).
- Demonstrated the first four-frame backlighting capability on a Z experiment, doubling the number of radiographs that can be acquired in a single shot (in conjunction with PAT). This is a crucial new capability for Z as it measures the time evolution of surface instabilities on a single shot rather than stitching together several shots.
- Made the first direct measurement of the nuclear burn width from back-to-back tritium experiments on Z using a gamma reaction history diagnostic (in conjunction with PAT and HED&IS).
- Successfully collected the first images of a double shell implosion at NIF using ARC high-energy x-ray radiography.
- Acquired the first electron radiographs of a test object using a laser-plasma accelerator platform on Omega EP.
- Performed new measurements with the scattered light uniformity imagers which showed a significant mode 1 variation in the scattered light on Omega than model predictions.
- Conducted experiments at Omega which showed that printed foam layers (via additive manufacturing) on planar foil targets significantly reduced laser imprint (when the laser drives the foam coated side of the foil).
- Printed and characterized foams structures with densities as low as 30 mg/cc as a part of target development efforts at Omega.

ICF Diagnostics and Instrumentation
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
ICF Diagnostics and Instrumentation $73,460,000	**ICF Diagnostics and Instrumentation $69,358,000**	**ICF Diagnostics and Instrumentation -$4,102,000**
• Develop highest-priority transformational diagnostics to include: developing next-generation high resolution velocimeters for NIF and Omega to measure material properties at extreme conditions; developing Wolter/toroidal hard x-ray imagers at NIF to discern hot spot temperature; finishing a prototype diagnostic for time resolved diffraction on NIF and assessing options for Omega; developing next-generation hybrid CMOS sensors to increase measurement sensitivity at NIF, Z, and Omega; and installing gamma reaction history diagnostic on Z. • Improve, field, and maintain key required local diagnostics and associated support systems to effectively execute experimental activities by capturing key data that will validate physics codes and reduce uncertainties in assessing nuclear weapons performance. This includes improving x-ray detectors, imagers, and spectrometers (radiation hardening, imaging at high yield, time-resolution), optical diagnostics (streak cameras, VISAR), and nuclear diagnostics (burn history, neutron time of flight detectors, stagnation diagnostics, fusion yield). • Develop new experimental capabilities and diagnostic support systems to include work on target systems and infrastructure support capabilities, cryogenic systems and gas fill operation improvements, and improvements on laser accuracy/performance and optics performance.	• **Transformational diagnostics development**: ○ Improved high resolution velocimetry at NIF, Omega. ○ Time resolved x-ray diffraction platform at NIF. ○ Improved equatorial/polar line-of-sight neutron imaging and equatorial gamma imaging for NIF. ○ FDR for time resolved neutron spectroscopy for NIF. ○ Next-gen hCMOS sensors for improved NIF, Z, and Omega diagnostics. ○ PQ third line of sight hot-spot x-ray imager at Omega. • **Local diagnostics development**: ○ EXAFS diagnostic for Pu EOS on NIF. ○ Gaseous radiochemistry diagnostic for double shell target measurements on NIF. ○ Neutron time of flight and x-ray streak diagnostics for Z. ○ Time resolved ultrafast x-ray imager for Z. ○ High-sensitivity gamma reaction history at Z. ○ Through-foil x-ray radiography platform using Fresnel Zone plate imager with monochromator at Omega. ○ 2-D VISAR optimization for laser imprint measurements; particle, x-ray time-resolved diagnostic optimization for hot-spot x-ray emission measurements at Omega.	• Decrease maintains support for critical diagnostic research and development while directing funds to higher priority efforts.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
	• **Local experimental capabilities development**: ○ Cryogenic magnetic field hohlraum platform for NIF. ○ Advanced cryogenic and gas-filled system configurations for ICF and AS platforms on Z. ○ Foam-coated implosion targets using additive manufacturing to mitigate laser imprint at Omega. ○ Next generation MIFEDS fabrication for Omega.	

Inertial Confinement Fusion
Facility Operations

Description

The ICF Facility Operations subprogram supports the suite of ICF experimental and design facilities, which provide high energy density (HED) capabilities and platforms for weapons physics and development of next-generation capabilities. The NIF, Z, and Omega HED facilities, as well as advanced target design facilities at LANL, play a critical role in exploring material properties, hydrodynamics, weapon output, effects, and survivability, platform and diagnostics development, ignition, and high yield. The NNSA ICF facilities continue to push the boundaries of HED science. As the best-in-class facilities in the world, they also serve to attract and challenge some of the nation's best physicists and engineers to the nuclear security enterprise.

ICF Facility Operations provides not only the facilities, but also diagnostics and targets essential to meet the experimental demands of the national HED experimental plans. Diagnostic capabilities become part of the facility operations after the design stage is complete. Proper fielding, upkeep, and calibration of these diagnostics are required to maintain high-fidelity measurements and data expected to meet research objectives. Target fabrication is a key component of SSP experiments on NNSA's major HED facilities including NIF, Omega, and Z. The target is at the heart of the experiments and its designs and details change based on the goals of the program, with over 200 new designs yearly. The recent advances at NIF have highlighted the effects of capsule imperfections as well as the attention required for successful mitigation techniques of managing necessary capsule non-uniformities such as fill tubes and positioning. Advanced target designs are being pursued at all facilities to explore aspects of energy coupling and to provide experimental platform for stockpile mission experiments. Funded through ICF Facility Operations, target production and research include ongoing work at both NNSA laboratories and contractors to advance the ICF capabilities.

The ICF facilities are aging and have urgent needs for refurbishment to sustain the level of precision and system deliverables required to continue to advance yield and performance boundaries. Needs beyond routine maintenance have been identified in each facility's Sustainment Plan. For example, at NIF, some systems, such as the main amplifiers and final optic systems, are experiencing damage and degradation due to debris. The debris sources must be eliminated, and the existing optical assemblies must be removed, refurbished, or replaced. Other systems, such as the control system's embedded controllers, have become obsolete and are no longer supported by industry so must be replaced. At Z, legacy systems such as insulating oil, water, and gas systems require updates. A major concern for continued operations past 2030 is the degradation of components in the Z energy storage system, including more than 2,000 capacitors. Over the next five years, a significant investment will be made to sustain the ICF facilities and assure their continued contributions to stockpile stewardship in the 2030s.

Activities of facility operations are identified by operations, maintenance, load and target consumables, and the research and engineering required to sustain the facility capabilities.

- **Operations:** Operation of the ICF facilities includes executing a shot or preparing for and/or recovering from a shot as well as the facility preparation and pre-/post-shot reviews necessary to assure that shots are machine-safe and optimized to achieve the user's goals. Advanced target facilities at LANL also provide unique access to new regimes of programmatic relevance.
- **Maintenance:** Each of these precision ICF facilities require a high level of maintenance, including the categories of preventative maintenance, reactive maintenance, and reliability/efficiency improvements. Preventative maintenance is routine maintenance intended to keep a system working properly. Reactive maintenance describes work on broken or impaired systems, including those maintenance items that were previously backlogged. Reliability and efficiency improvements incorporate minor system improvements to enhance reliability and/or efficiency but do not include significant improvements or new capabilities.
- **Loads/target consumables:** The loads and targets for experiments at ICF facilities require careful preparation and construction for each. These include the consumables of experimental campaigns as well as refurbishments necessary for key load/target hardware which is routinely refurbished or repaired.

- **Sustaining capabilities:** Assuring continued high performance and reliability is key to optimal scientific output. Each of the ICF facilities is over 10 years old and requires ongoing refurbishment including replacing obsolete and unmaintainable systems with updated equipment that utilizes technology improvements and implement reliability and efficiency upgrades to improve facility productivity. Independent of improvements to energy and power, the NIF, Z, Omega, and LANL facilities require a range of sustainment investments that the program is in the process of prioritizing. Such updates will be required to enable another decade of stockpile science on ICF facilities.
- **New capabilities:** To address gaps in the current experimental capabilities, the next generation HED experimental facility capabilities will achieve a wider range of coverage required to access weapons-relevant regimes beyond the reach of current and enhanced HED experimental capabilities and provide agility and responsiveness to meet emerging Stockpile Stewardship problems and address currently unresolved weapon physics issues. There are two projects under consideration, an Enhanced Fusion Yield Capability that will allow the capability to deliver a laser source over 3 MJ to the target, and the second one involves pursuing a Next Generation Pulsed Power facility capable of delivering sufficient energy to conduct material research, radiation flow, hydrodynamic transport and demonstrate high-yield phenomena.

Assessment Science, Advanced Simulation and Computing, Stockpile Management, Weapon Survivability, and other stockpile program elements, as well as external mission partners including Defense Threat Reduction Agency and the United Kingdom's Atomic Weapons Establishment (AWE), are informed by, access, and benefit from the capabilities developed by this subprogram to successfully meet SCDS pegposts and execute the NNSA Stockpile Stewardship Management Plan.

Highlights of the FY 2024 Budget
- Provide operational facilities to obtain the key data that reduce uncertainty in calculations of nuclear weapons performance.
- Obtain data on the properties of high atomic-weight materials, such as uranium and plutonium, in new weapon-relevant HED regimes using the Z at SNL and the NIF at LLNL.
- Operate all NNSA-funded national HED facilities safely in accordance with their Governance Plans.
- Refurbish and recapitalize the most critical systems as identified in the facility sustainment plans and prioritized by the program.
- Advance unique target design and development capabilities at LANL.
- Support the highest-priority HED experimental needs, within assessment science, nuclear survivability, and explore the MJ platform.
- Explore technology to support future facility investments, such as new approaches to energy balance, laser plasma instabilities (LPI), and improved energy coupling.

FY 2025 – FY 2028 Key Milestones
- Execute experiments approved by ICF program management and the combined HED/ICF Council. This task is the top priority for the Facility Operations funding. Delivering on this priority requires well-maintained and calibrated facilities, quality targets, calibrated diagnostics, and highly skilled staff to execute the highly complex and precise HED experiment schedules.
- Assure that core experimental capabilities are proactively maintained by executing refurbishment and recapitalization of key ICF facility systems necessary to sustain performance levels of ICF facilities.
- Mitigate implosion degradation mechanisms through target advancements.
- Increase plutonium capabilities and number of experiments on both Z and NIF.
- Increase the fraction of tritium used in ICF experiments at Z.
- Estimate achieving CD-1 for both NGPP and NIF Power and Energy Upgrade projects in FY 2026.

FY 2022 Accomplishments
- **Experiments executed on NNSA's HED facilities:**
  - NIF experiments: 364; Z experiments: 130; Omega/Omega-EP experiments: 2,122.

- **High impact stockpile stewardship experiments:**
  - Completed the first Pu ramp equation-of-state (EOS) experiment on the NIF, the first in a series that will provide high accuracy stress-density measurements in ramp compressed Pu to unprecedented pressures.
  - Completed the first shot in a production science series at Z, designed to explore efficient and agile pit manufacturing and sensitivity to material chemistry.
  - Completed back-to-back SNM experiments at Z, for the first time, to compare the compressibility of new and aged Pu for stockpile applications.
  - Completed experiments to measure the response of materials to shock insults in warm x-ray environments produced at Z and NIF, In support of goals in the weapon survivability program.
  - Completed a set of three DT layered experiments on the NIF to assess the performance variability in the 1MJ yield regime.
  - Experiments executed on the NIF provided data on the co-propagating shocks to validate modeling complex hydrodynamics in ICF.
- **New or improved capabilities developed on HED facilities:**
  - Adopted an extended workflow process at Z that has improved robustness of shot operations and improved the efficiency (shot rate) by 17%.
  - Obtained the first time-resolved absorption spectra with ultrafast x-ray imagers at Z.
  - A series of high-IFAR and high-adiabat implosions all produced neutron yields in excess of the previous record for Omega.
  - The first electron radiographs of a test object were acquired using a laser-plasma accelerator platform on Omega EP.
  - Developed multi-year plans for facility sustainment of Z, NIF, and Omega.
  - Developed a method for printing and characterizing foams structures with densities as low as 30 mg/cc, which can be used to mitigate the hydrodynamic growth of imperfections imprinted using direct laser illumination.
  - Commissioned a High-Density Carbon (HDC) capsule coating and polishing capability at LLNL to allow for research and development of mitigations to HDC capsule imperfections.

Facility Operations
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Facility Operations $441,818,000	**Facility Operations $422,023,000**	**Facility Operations -$19,795,000**
• Begin refurbishment and recapitalization of most critical systems as identified in facility sustainment plans. • Operate all NNSA-funded national HED facilities safely in accordance with their Governance Plans. • Support the highest-priority HED experimental needs within assessment science, nuclear survivability, and the pursuit of multi-MJ yield at NIF, Z, and Omega. • Advance unique target design and development capabilities at LANL.	• Execute critical elements of the NIF, Z, and Omega sustainment plans. • Improve robustness of amplifier blast shield line replaceable unit inserter. • Optimize Shot Management Approach. • Complete authorization for increased tritium usage on Z. • Improve capsule finishing processes to reduce features and imperfections. • Replace NIF target chamber imaging and lighting systems for long term sustainability of positioner alignment operations. • Continue support of conceptual design activities for NIF sustainment projects.	• Decrease represents reprioritization of resources to support higher priority NNSA programmatic efforts while balancing critical sustainment and maintenance needs to restore HED facilities to full capability.

Stockpile Research, Technology, and Engineering
Advanced Simulation and Computing

Overview

The Advanced Simulation and Computing (ASC) program provides high-end simulation capabilities (e.g., modeling codes, computing platforms, and supporting infrastructure) to meet the requirements of the SSP. Modeling the complexity of nuclear weapons systems is essential to maintaining confidence in the performance of our stockpile without underground nuclear testing. The ASC program provides the weapon codes that provide the integrated assessment capability supporting annual assessment and future sustainment program qualification and certification of the stockpile. ASC is also an integral element of the Stewardship Capability Delivery Schedule (SCDS). ASC provides critical capabilities that help inform decision-making related to the sustainment of the nuclear stockpile in support of U.S. national security objectives. The program also coordinates with NNSA and other government agencies, including the Intelligence Community, to support nonproliferation, emergency response, nuclear forensics, and attribution activities.

The ASC computing capabilities are the key integrating mechanism across the nuclear weapons program through the integrated design codes (IDCs), which contain mathematical descriptions of the physical processes of nuclear weapons systems and functions. Combined with weapon-specific data, these IDCs support high-fidelity physical models used to carry out design studies, maintenance analyses, the Annual Assessment Reports, sustainment programs, SFIs, and weapons dismantlement activities, all without additional underground explosive nuclear testing. The IDCs currently perform well for general mission-related activities. However, issues such as aging, potential new threats, and new manufacturing techniques require IDCs with new, enhanced-fidelity physical models that use high-performance computing (HPC) resources more effectively. ASC capabilities that support the stockpile stewardship mission were built on the computing technologies commercially available for the past two decades. To provide increased computing power for general consumer markets, industry has evolved beyond and away from the scientific computing needs. ASC must maintain currency with the computing industry to ensure continued performance of the IDCs on the next-generation compute platforms, as required to maintain a credible nuclear deterrent and address potential additional mission needs in non-proliferation, emergency response, nuclear forensics, and attribution programs.

In addition to these capabilities, the ASC program is executing several internal initiatives, or special projects, to leverage developing technologies and capabilities to support the sustainment of the nuclear stockpile. ASC established the Large-Scale Calculations Initiative (LSCI) a few years ago to determine the limitations and scaling potential of our current assessment capabilities. This initiative assesses the potential of current HPC platforms, codes, and qualified personnel by exploring physics calculations that are impractical for regular assessment capabilities due to job sizes, time length of the code runs, or a combination of the two. The initiative pushes the national security laboratories to look beyond current computing abilities to make today's hero calculations those of routine business soon for a variety of NNSA missions. Another effort is the Advanced Machine Learning Initiative (AMLI), which aims to increase the use of commercially available artificial intelligence hardware and further develop machine learning algorithms to add to the ASC physics-informed simulation portfolio. This initiative can significantly increase efficiency, improve models to better match experimental data, and tighten the integration of multi-scale and multi-dimensional models, while addressing concerns with validation of these techniques when new errors are introduced. Another initiative across the national security laboratories is quantum computing (QC), which seeks to develop new methods and expertise in algorithm development and hardware evaluations to develop promising QC technologies suitable for nuclear weapon applications. The ASC program aims to drive efficiencies into the manufacturing process through its Production Simulation Initiative (PSI). Efforts such as the Simulation First initiative at KCNSC incorporates physics-based simulation into production operations to optimize solutions.

The Advanced Simulation and Computing program is composed of six subprograms:

1. **Integrated Codes** produces large-scale, full-physics IDCs that allow the performance of detailed nuclear weapons assessments without the need for additional nuclear explosive testing.
2. **Physics and Engineering Models** provides the models and databases used in simulations supporting the U.S. stockpile.
3. **Verification and Validation** brings the Integrated Codes and Physics and Engineering Models subprograms of ASC together with the Stockpile Management program to evaluate the capability of IDCs.

4. **Advanced Technology Development and Mitigation** addresses the need to build new IDCs that are more aligned with emerging, next-generation system architectures and to develop next-generation computing technologies and software.
5. **Computational Systems and Software Environment** builds an integrated, balanced, and scalable computational capabilities, including HPC systems and requisite software stacks.
6. **Facility Operations and User Support** provides the facilities and user services required to enable nuclear weapons simulations.

Advanced Simulation and Computing
Integrated Codes

Description

The Integrated Codes (IC) subprogram produces large-scale IDCs that enable detailed nuclear weapons assessments without the need for additional underground nuclear explosive testing. They are the codes used for physics and engineering stockpile assessments to support concept studies, certification, maintenance analyses, LEPs, Alts, SFIs, and weapons dismantlement activities. The IDCs represent a repository of knowledge gained from experiments on NNSA's wide range of facilities, legacy nuclear explosive tests, enhancements made to support the Stockpile Management program, and a variety of other critical national security missions. These codes enable nuclear forensics, foreign assessments, and device disablement techniques related to nuclear counterterrorism efforts and the study of nuclear weapons behavior in normal, abnormal, and hostile environments, as well as outputs to enable effects estimates.

The IC subprogram also maintains select legacy codes and is responsible for ancillary tools that support the weapons mission. These specialized codes enable simulation workflow, generate models or information used by the IDCs, and validate the IDCs by comparison with experimental data obtained from facilities, such as Z and NIF. In this way, IC serves as an integrating tool for activities across SRT&E.

Long-term technical goals for the IC subprogram are to provide credible simulation capabilities that cover all the relevant physics and maximize performance on current and future ASC computing platforms. These goals are achieved through collaborative activities with the Physics and Engineering Models (PEM), Verification and Validation (V&V), Computational Systems and Software Environment (CSSE) subprograms, and experimental programs in the Office of Experimental Sciences. The IC subprogram sustains activities that enable simulation capabilities to use complex and heterogeneous node architectures of future high-performance computing (HPC) platforms through advances achieved by the Computational Systems and Software Environment (CSSE) subprogram.

Highlights of the FY 2024 Budget

- Continue to provide weapons code capabilities to the NNSA nuclear security enterprise for annual assessments, SFI investigations, LEP qualification and certification, and related nuclear security assessments.
- Support next-generation software readiness and testing of integrated design codes on the El Capitan system and continue to develop code capabilities to support critical missions and adapt to future HPC architectures.
- Continue to support production agencies using ASC codes and computing resources as part of the Production Simulation Initiative (PSI).

FY 2025 – FY 2028 Key Milestones

- Develop and deploy a production-level simulation capability to perform assessments and develop mitigation strategies for hostile encounters.
- Optimize next-generation weapons code technologies on advanced architecture systems, address remaining performance and portability issues, and improve code usability for critical missions.
- Develop and deploy science-based modeling capabilities to drive efficiency and productivity between the design and production agencies as part of the PSI, and support digital engineering environment for broader stockpile missions.
- Continue development of high-fidelity codes to simulate new materials in relevant reentry environments.

FY 2022 Accomplishments

- Maintained full baselines for all stockpile systems and used these baselines to improve the fidelity of annual stockpile assessments.
- Advanced nuclear performance assessment codes for boost and secondary performance; safety codes to address multi-point safety issues; and engineering assessment codes for hostile, normal, and abnormal environments.
- Improved usability and optimized workflows for production capabilities on current NNSA laboratory computing platforms and exercised El Capitan's early access system-3 (EAS-3) nodes in preparation for final system deployment.

Integrated Codes
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Integrated Codes $154,056,000	**Integrated Codes $155,145,000**	**Integrated Codes +$1,089,000**
• Further develop existing and next-generation integrated codes to support stockpile sustainment, for stockpile modernization, including performance in relevant environments, and relevant safety issues. • Develop and deploy simulation tools to be utilized by production agencies. • Support analysts and designers in utilization of the updated integrated design codes. • Port and optimize performance current and next-generation integrated design codes to the El Capitan early access system-3 (EAS-3) nodes and Crossroads Phase 1 system, named Tycho.	• Continue to provide weapons code capabilities to the NNSA nuclear security enterprise for annual assessments, SFI investigations, LEP qualification and certification, and related nuclear security assessments. • Support next-generation software readiness and testing of integrated design codes on the classified El Capitan and Crossroads systems. • Develop additional code capabilities to support critical missions and future systems. • Continue to support production agencies using ASC codes and computing resources as part of the Production Simulation Initiative (PSI).	• Increase provides additional support to improve usability of IC capabilities for LEPs and national security applications and for developing methods and capabilities to integrate high-fidelity modeling into the NNSA digital engineering enterprise.

Advanced Simulation and Computing
Physics and Engineering Models

Description

The Physics and Engineering Models (PEM) subprogram provides the models and databases used in simulations supporting the U.S. stockpile. These models and databases describe a wide variety of physical and engineering processes occurring in a nuclear weapon lifecycle. The capability to accurately simulate these processes is required for annual assessment; design, qualification, and certification of warheads undergoing sustainment programs; resolution (and in some cases generation) of SFIs; and the development of future stockpile technologies. The PEM subprogram is closely linked to the Assessment Science program within the SRT&E, which provides the experimental data that informs development of new models used in simulation codes.

The PEM subprogram's responsibilities are threefold: 1) to provide mathematical models and databases to represent physical behavior and physical data (e.g., equation of state (EOS), strength parameters, radiation opacities and nuclear cross-sections) for use in the IDCs; 2) to collaborate with the IC subprogram to implement these models and data in the IDCs; and 3) to collaborate with the Verification & Validation (V&V) subprogram to ensure the models have been implemented correctly (verified) and have been compared to experimental data (validated).

Highlights of the FY 2024 Budget

- Support survivability and hostile environment modeling across current and future high-performance computing systems for current and future stockpile systems.
- Continue developing foundational materials modeling infrastructure to fully support and utilize next-generation architectures.
- Improve physics models relevant to full range of applications. This includes improved modeling of multi-physics response to combined abnormal environments, expanding current inline opacity capabilities to support modeling certification efforts and hostile environments, and implementing phase-aware material models for strength and ejecta.
- Develop initial material response models to inform material development approaches, including thermal protection system materials, along with quantified uncertainties.
- Further develop and deploy production relevant material models. Model improvements will enable an integrated, multiscale modeling approach that links the process-structure-properties-performance aspects of components to positively impact production requirements.

FY 2025 – FY 2028 Key Milestones

- Deploy physics models and simulation methodologies for evaluation of weapon performance and response in relevant environments.
- Build focused physics simulation capabilities and libraries that take full advantage of advances in next-generation computing architectures and algorithmic advances in heterogeneous computing environments, quantum computing, neuromorphic computing, and machine learning to provide improved material property and performance assessments. This activity will involve partnering with V&V and CSSE.
- Develop improved age-aware models that enable predictions of current and future stockpile system performance in single and combined environment scenario and provide initial age-aware physics models to update lifetime assessments in the AAR.
- Incorporate expanded scientific understanding of HE into relevant model development to address stockpile-to-target sequences off-nominal and safety scenarios while bolstering tri-lab cooperation.

FY 2022 Accomplishments

- Adapted an electrodynamic model to underwrite safety procedures for assessing electrostatic threat discharge events, increasing throughput at Pantex.
- Developed new methods to non-destructively detect signatures of degradation, aging or other performance anomalies in electronic devices and subassemblies. These tools and methods will also provide assurance for insertion of new electronic technologies into the stockpile.

- Improved Pu aging models and evaluations as part of the FY 2022 SCDS Pegpost: Assessing Lifetimes and Mitigate Aging.
- Improved modeling surface defect modeling to understand impacts of manufacturing on the performance of pits.
- Improved methods to characterize explosives in support of the W80-4 LEP.

Physics and Engineering Models
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Physics and Engineering Models $78,304,000	**Physics and Engineering Models $79,435,000**	**Physics and Engineering Models +$1,131,000**
• Support survivability and hostile environment modeling across current and future HPC systems. • Utilize foundational materials modeling infrastructure to fully support Crossroads and El Capitan, in addition to preparing for other advanced architectures. • Improve and deploy modeling capabilities to positively impact production requirements as part of PSI. • Develop age-aware physics models. • Develop and refine mission-relevant quantum simulation algorithms.	• Continue developing and utilizing foundational materials modeling infrastructure to fully support and utilize next-generation architectures. • Support survivability and hostile environment modeling across current and future high-performance computing systems for current and future stockpile systems. • Improve physics models relevant to full range of applications. • Develop initial material response models to inform material development approaches, including thermal protection system materials, along with quantified uncertainties. • Further develop and deploy production-relevant material models. Model improvements will enable an integrated, multiscale modeling approach that links the process-structure-properties-performance aspects of components to positively impact production requirements.	• Increase provides additional support to expand development and deployment of new workflow and analysis capabilities.

Advanced Simulation and Computing
Verification and Validation

Description

The Verification and Validation (V&V) subprogram provides evidence that the models in the codes produce mathematically credible answers that reflect physical reality. V&V focuses on establishing soundness in integrated simulation capabilities by collecting evidence that the numerical methods and simulation models are being solved correctly and whether the simulation results from mathematical and computational models implemented into the codes are in alignment with real-world observations. The V&V subprogram funds the critical skills needed to apply systematic measurement, documentation, and demonstration of the ability of the models and codes to predict physical behavior.

V&V brings the IC and PEM subprograms together with other SRT&E activities to evaluate the capability of the IDCs. Verification activities demonstrate that the IDCs and PEM models are correctly solving their respective governing equations. Validation activities ensure that both science codes and IDCs are solving the equations accurately, and that the models themselves are sufficiently precise for the intended application. Together, these subprogram activities provide a technically rigorous, credible, and sensible foundation for computational science and engineering calculations by developing, exercising, and implementing tools that provide confidence in the simulations of high-consequence nuclear stockpile problems.

Highlights of the FY 2024 Budget

- Improve necessary next-generation verification and validation techniques to continue support in methods, assessments, and data archiving.
- Continue extending the verification and validation infrastructure to include next-generation integrated design codes.
- Support advancement of V&V and Uncertainty Quantification (UQ) suites to support the current stockpile integration of common modeling workflows.
- Integrate test suites into existing workflows for supporting a broad customer base.
- Demonstrate improved and validated nuclear data from machine learning techniques demonstrated into material response and plasma models.
- Implement the Engineering Common Model Framework to enhance common modeling techniques for ASC capabilities.

FY 2025 – FY 2028 Key Milestones

- Utilize capabilities to evaluate the fidelity of the simulation tools in collaboration with integrated codes, model development, and weapon application communities.
- Support responsive deterrent capabilities through predictive models, experimental collaborations and integrated V&V/UQ processes.
- Collaborate with PEM to support the development of credible and interpretable machine learning toolkits to enable physics-constrained ML models with quantifiable uncertainties and holistic data assessments.
- Establish a V&V/UQ framework and workflows to support the credible application of next-generation codes on current and emerging platforms.
- Enhance provision of tools and methodologies for estimating the uncertainty in weapon simulation results from the IDCs.

FY 2022 Accomplishments

- Completed progress towards uncertainty quantification (UQ), sensitivity, and code verification studies using one-way capability.
- Improved V&V suites with progress on adding models of modern AGEX and subcritical experiments in a way that unifies respective workflows.
- Tested models that were implemented in the appropriate Common Modeling Framework (CMF) authority for assessment of capabilities for modeling the strength and EOS of aging materials.
- Supported training on the use of UQ tools, aided by enhanced advanced machine learning techniques.
- Completed development of new workflow for uncertainty quantification, and solution verification to quantify and compare several sources of uncertainty in coupled aerothermal analysis.

Verification and Validation
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Verification and Validation $59,878,000	**Verification and Validation $59,399,000**	**Verification and Validation -$479,000**
• Improve necessary next-generation verification and validation techniques to continue support in methods, assessments, and data archiving. • Enhance V&V protocols for algorithms running on advanced HPC architectures. • Develop and provide training on the use of new and existing UQ tools. • Implement quality assurance controls to ensure material and nuclear databases are correctly updated and maintained. • Develop and refine the primary and secondary common models.	• Improve necessary next-generation verification and validation techniques to continue support in methods, assessments, and data archiving. • Continue extending the verification and validation infrastructure to include next-generation integrated design codes. • Support advancement of V&V and Uncertainty Quantification (UQ) suites to support integration of common modeling workflows. • Integrate test suites into existing workflows for supporting a broad customer base. • Demonstrate improved and validated nuclear data from machine learning techniques demonstrated into material response and plasma models. • Implement the Engineering Common Model Framework to enhance common modeling techniques for ASC capabilities.	• The decrease reflects steady-state V&V support activity for next-gen codes and models.

Advanced Simulation and Computing
Advanced Technology Development and Mitigation

Description

The Advanced Technology Development and Mitigation (ATDM) subprogram is transitioning laboratory code and computer engineering/science projects, supporting long-term simulation and computing goals relevant to both exascale computing and the broad national security missions of NNSA, to the other ASC subprograms as these tools and capabilities will support code usability for broader mission applications. In prior years, this subprogram had addressed the need to build new IDCs that are more aligned with emerging technologies and to engage in co-design collaborations with industry and other agencies to evolve the HPC operating systems and development software so that next-generation weapons codes will perform well on future HPC systems.

The current ASC simulation capabilities are encountering a computing paradigm change as HPC technologies evolve to radically different and more complex (many-core or heterogeneous) architectures. This subprogram addresses three major challenges: 1) the radical shift in computer system architectures, 2) maintaining current IDCs that took more than a decade to develop and validate, and 3) adapting current capabilities as evolving computing technologies become increasingly disruptive to the IDCs.

As the ATDM work scope is being transitioned to other ASC subprograms, the program continues to seek solutions for remaining issues associated with evolving system architectures.

Highlights of the FY 2024 Budget

- No funds are requested for this program. The subprogram will have achieved the NNSA Exascale Computing Project (ECP) objectives at end of FY 2023.

FY 2025 – FY 2028 Key Milestones

- The subprogram will have achieved the NNSA ECP objectives at end of FY 2023.

FY 2022 Accomplishments

- Sustained portfolio of the ATDM subprogram and hardened simulation capabilities to evaluate hostile environment response, along with accelerated development of next-generation IDCs and mission-support software stack.
- Contributed to the collaboration with National Cancer Institute via Accelerating Therapeutic Opportunities in Medicine (ATOM) and Joint Design of Advanced Computing Solutions for Cancer (JDACS4C) projects.

Advanced Technology Development and Mitigation

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Advanced Technology Development and Mitigation $12,000,000	**Advanced Technology Development and Mitigation $0**	**Advanced Technology Development and Mitigation -$12,000,000**
• Continue funding NNSA-specific projects as part of the Exascale Computing Project (ECP) Software Technology portfolio in the Next-Generation Architecture and Software Development product group.	• None	• Decrease due to stand-down of subprogram.

Advanced Simulation and Computing
Computational Systems and Software Environment

Description

The Computational Systems and Software Environment (CSSE) subprogram builds a portfolio of integrated, balanced, and scalable computational capabilities to provide the needed computing environment stability to protect NNSA's investment in IDCs. In addition to the powerful Commodity Technology (CT), Advanced Technology (AT), and Advanced Architecture Prototype (AAP) systems that the program fields, the supporting software infrastructure that is deployed on these platforms includes many critical components, ranging from system software to input/output (I/O) services, storage and networking, post-processing (visualization and data analysis tools), and next-generation computing technologies. CSSE also examines possible future technologies beyond exascale, such as quantum, neuromorphic, and non-complementary metal-oxide-semiconductor (non-CMOS)-based computing components.

The CSSE subprogram provides the computational infrastructure, both hardware and software, necessary to support weapon applications, as follows:

- Design, develop, and deploy usable computing systems. The CSSE subprogram will design and procure HPC systems required to support stockpile stewardship and broader nuclear security missions. These systems will include testbeds, prototypes and early access systems for evaluation and analysis of code performance issues on next-generation hardware, CT systems for most stockpile computing work, and AT systems for large-scale simulation workloads and predictive science advancements.
- Provide comprehensive, stable computing and development environments across the national security laboratories. The CSSE subprogram will also provide the system software and user environments necessary for code development and simulation using the computing hardware.

Authorized by DOE Order 130.1A, ASC will use a lease-to-purchase funding vehicle for ASC Commodity Technology and Advanced Technology Systems (CTSs/ATSs), and storage system procurements when such vehicles are found to provide the best programmatic and financial value to the government. Funding for the lease-to-purchase contracts will be provided on a year-by-year basis as annually appropriated during the period of performance of each lease-to-purchase contract.

Highlights of the FY 2024 Budget

- Execute classified modeling and simulation campaigns on the ATS-3/Crossroads system.
- Execute High-Performance Networking Interconnect R&D project award.
- Transition ATS-4/El-Capitan into classified computing service.
- Deploy scalable, exascale-class software technologies into production ATS and CTS user environments.
- Initiate the ATS-5 system procurement for a future classified computing resource to be deployed at LANL in FY 2027.
- Complete the AAPS-2/Vanguard-II system integrator procurement to prepare siting of system at SNL in FY 2025.
- Complete CTS-2 system deployments and transition to unclassified and classified service.

FY 2025 – FY 2028 Key Milestones

- Execute Advanced Memory Technology R&D program.
- Deploy the AAPS-2/Vanguard-II system at SNL.
- Deploy and transition ATS-5 system into classified computing service.
- Initiate CTS-3 procurement.
- Initiate ATS-6 procurement for a future classified computing resource to be deployed at LLNL.
- Initiate technology evaluation activities for a future AAPS-3/Vanguard-III system to be deployed at SNL
- Deploy AI/ML computing resources and supporting data infrastructure in unclassified and classified environments.
- Deploy AI/ML software environment for science and engineering.
- Optimize and extend exascale-class software technology environment for next generation of ATS and CTS platforms.

FY 2022 Accomplishments

- Received hardware for ATS-3/Crossroads Phase 1 system at LANL (named Tycho).
- Deployed Early Access System (EAS-3) resources for ATS-4/El-Capitan at LLNL (including initial classified computing resources).
- Issued an R&D contract to Cornelis Networks to conduct next-generation high-performance interconnect research and development.
- Developed prototype exascale software environments for ATS-3/Crossroads and ATS-4/El-Capitan in collaboration with vendors and ECP partners.
- Executed a procurement (including RFI and RFP) for Advanced Memory Technology R&D contracts.

Computational Systems and Software Environment
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Computational Systems and Software Environment $289,623,000	**Computational Systems and Software Environment $258,349,000**	**Computational Systems and Software Environment -$31,274,000**
• Deploy and complete acceptance of the ASC ATS-3/Crossroads system at LANL. • Deploy initial hardware deliveries of the ASC ATS-4/El-Capitan system at LLNL. • Deploy CTS-2 platforms at the NNSA laboratories and in support of the KCNSC. • Manage the Advanced Memory Technology and Next-Generation High-Performance Networking R&D contracts. • Continue evaluation of quantum, AI/ML and neuromorphic technologies for DP and national security missions. • Issue an RFP for the system integrator for SNL AAPS-2/Vanguard-II platform.	• Deploy additional CTS-2 systems at the NNSA laboratories and nuclear security enterprise partners. • Design and deploy an initial AI/ML-focused infrastructure to support broader mission use of AI and ML technologies. • Harden tri-lab computing environment to support classified simulations on Crossroads, El Capitan and CTS-2 platforms.	• The decrease maintains funding for Advanced Memory Technology requirements while managing program priorities.

Advanced Simulation and Computing
Facility Operations and User Support

Description

The Facility Operations and User Support (FOUS) subprogram provides the facilities and services required to support nuclear weapons simulation workloads. Facility Operations includes physical space, power, and other utility infrastructure, and Local Area/Wide Area Networking for local and remote access, as well as system administration, cybersecurity, and operations services for ongoing support. User Support includes computer center hotline and help-desk services, account management, web-based system documentation, system status information tools, user training, trouble-ticketing systems, common computing environment, and application analyst support.

The FOUS subprogram is responsible for management of the computer operations and maintenance and for system administration and user support. This includes:

- Effective management of computing hardware infrastructure. The FOUS subprogram will provide adequate power, cooling, and integrated facilities to support the computing system hardware, and it will provide the requisite networking and storage infrastructure.
- Responsive system administration, maintenance, and user support. The FOUS subprogram will administer the computational systems, manage the job scheduling capability, and provide responsive support to the user community.

Authorized by DOE Order 130.1A, ASC will utilize lease-to-purchase funding contracts for Commodity Technology and Advanced Technology Systems, visualization cluster and storage system procurements when such contracts are found to provide the best programmatic and financial value to the government. Funding for the lease-to-purchase contracts will be provided on a year-by-year basis as annually appropriated during the period of performance of each lease-to-purchase contract.

Highlights of the FY 2024 Budget

- Prepare the ASC computing facilities at the NNSA laboratories for the next-generation platforms.
- Operate CTS-2 platforms at the NNSA laboratories.
- Operate ATS-3/Crossroads at LANL, including remote computing capabilities.
- Integrate El Capitan (ATS-4) into tri-lab classified computing environment.

FY 2025 – FY 2028 Key Milestones

- Complete required building preparation for ATS-5 siting, including expanding the warm-water cooling system and electrical capacity at the Strategic Computing Complex (SCC) to enable up to 50MW of supercomputing.
- Maintain continuous operation and usage of ATS-3/Crossroads and ATS-4/El Capitan.
- Operate ATS-4/El Capitan, ATS-5 system, CTS-3 systems, and Application Readiness Testbeds (ART).
- Operate the Vanguard-2 platform as a tri-lab, production-level HPC system.
- Retire Sierra (ATS-2).

FY 2022 Accomplishments

- Deployed three El Capitan early access system-3 (EAS-3) platforms at LLNL (RZVernal, Tenaya and Tioga), one in each Livermore Computing (LC) computing zone, to be used as application porting testbeds by ASC code teams. The systems were upgraded using the TOSS 4 system software stack.
- Completed the Exascale Computing Facility Modernization (ECFM) project by obtaining CD-4 on May 5, 2022.
- Completed construction of the Crossroads Installation Project for necessary electrical, mechanical, and structural modifications and additions required to install the Crossroads system at LANL.
- Completed testing for the full deployment of the classified DisCom 100Gbps encryptors for production availability utilizing certified classified encryption keys.
- Completed deployment of additional systems and capabilities on the trilab inter-site HPC (iHPC) network, including the deployment of Vanguard II test system, named Lux, on the iHPC in support of enhancing tri-lab HPC capabilities within the Remote Computing Enablement (RCE) project.

- Procured and installed new storage and networking infrastructure in preparation for Crossroads and CTS-2 systems at LANL.
- Continued production operation of Trinity (ATS-1) and CTS-1 systems named Snow, Fire, Ice, and Cyclone in full-production use, peaking with over 92% utilization and 99% system availability.

Facility Operations and User Support
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Facility Operations and User Support $196,139,000	**Facility Operations and User Support $230,144,000**	**Facility Operations and User Support +$34,005,000**
• Maintain full operation of CTS-2 systems. • Maintain maximum availability of computer cycles to end users. • Document and implement new best practices. • Provide operational support for reliable and secure production computing environment. • Prepare for insertion of next-generation architectures (systems and testbeds). • Implement contingency response plans, as necessary. • Demonstrate stable, production-level remote computing capabilities with ATS-3/Crossroads. • Complete required building preparation for ATS-4/El Capitan. • Support the installation and start of operations of ATS-4/El Capitan. • Continue design and construction of additional power and cooling upgrades for SNL's 725-E HPC Facility. • Continue to improve tri-lab common computing environment to include more heterogeneous architectures in the CTS environment.	• Maintain full operation of CTS-2 systems. • Maintain maximum availability of computer cycles to end users. • Document and implement new best practices. • Provide operational support for reliable and secure production computing environment. • Prepare for insertion of next-generation architectures (systems and testbeds). • Implement contingency response plans, as necessary. • Continue to improve tri-lab common computing environment to include more heterogeneous architectures in the CTS environment. • Integrate into and operate ATS-4/El Capitan in the tri-lab classified computing environment. • Continue to improve tri-lab common computing environment to include more heterogeneous architectures in the CTS environment.	• Increase reflects operation of El Capitan, Crossroads, and CTS-2 platforms in production service. It also includes facility preparation (including minor construction projects) for future HPC system installations, while maintaining operations across tri-lab computing infrastructure.

Stockpile Research, Technology, and Engineering
Weapon Technology and Manufacturing Maturation

Overview

The Weapon Technology and Manufacturing Maturation program is responsible for developing agile, affordable, assured, and responsive technologies and capabilities for nuclear stockpile sustainment and modernization to enable Defense Programs' mission success and the future success of the nuclear security enterprise.

The core areas of work include:

- **Agile, Assured, and Affordable Technologies:** Developing and modernizing stockpile technologies and processes so the techniques are agile, assured, and responsive to change, shortening design, qualification, certification, and manufacturing cycles and timelines to improve future affordability.
- **Partnership with Stakeholders to Meet Stockpile and Customer Requirements:** Identifying, sustaining, enhancing, integrating, and continually exercising all capabilities, tools, and technologies across the science, engineering, design, certification, and manufacturing cycle, working together with the Department of Defense, national security laboratories, nuclear weapon production facilities, and other partners.
- **Qualification and Certification:** Collaborating with other Defense Programs partners to conduct experiments and simulations that enable qualification and certification without nuclear explosive testing.
- **Skilled Technical Workforce and Enhanced Capabilities:** Maintaining a qualified technical workforce and enhanced capabilities by transferring knowledge, skills, and direct experience with respect to all stockpile technologies and processes.

Primary responsibilities of this program include:

- Developing innovative technologies that both minimize the probability of unauthorized use and maximize reliability for authorized use of nuclear weapons.
- Leading technology and system demonstration efforts, with various mission partners, to speed development and improve acceptance of advanced technologies and processes into the stockpile and the nuclear security enterprise.
- Improving agility, effectiveness, safety, and efficiency in the design and manufacture of war reserve components using advanced technologies and manufacturing processes.

The Weapon Technology and Manufacturing Maturation program is made up of three subprograms:

1. **Surety Technologies** creates and matures options, internal and/or external to the warhead, to minimize the potential for deliberate unauthorized use, or denial of authorized use, of a U.S. nuclear weapon while maximizing the reliability of authorized use of a U.S. nuclear weapon and maintaining the highest levels of safety.
2. **Weapon Technology Development** funds activities associated with the development, engineering, and integration of technologies that ensure the reliable performance, safety, and handling of current and future stockpile systems. Technology demonstrations and related activities are also covered under this subprogram.
3. **Advanced Manufacturing Development** rapidly develops and deploys advanced manufacturing methodologies and processes that are responsive to the NNSA mission.

Weapon Technology and Manufacturing Maturation
Surety Technologies

Description
The Surety Technologies program is dedicated to simultaneously minimizing the probability of unauthorized use and maximizing the reliability of authorized use of a U.S. nuclear weapon while maintaining the highest levels of safety. Surety Technologies creates, develops, and matures advanced safety, security, and use-control or denial technologies to minimize the probability of an accidental nuclear explosion and, in the unlikely event that security fails and unauthorized access is gained, reduces the risk of an unauthorized nuclear yield to the lowest practical level.

Surety Technologies seeks advances in leading-edge technologies in two timeframes:
- Maturing near-term surety concepts and technologies to offer the most effective surety solutions for the enduring stockpile and future insertion opportunities achievable within the timelines of known weapon modernization schedules or other improvements that will maintain weapon functionality.
- Creating and evolving highly advanced surety technologies, independent of specific weapon types or insertion opportunities that can result in major surety improvements.

Surety Technologies incorporates national security guidance as outlined in the Presidential Policy Directive (PPD)–35; Department of Energy Order 452.1E, *Nuclear Explosive and Weapon Surety Program* and its new surety requirements; the NNSA Defense Programs surety strategy; and the 2010 JASON Surety Study findings and recommendations; in conjunction with the Joint Integrated Lifecycle Surety risk assessment capability to identify the most cost-effective surety technologies. This enables program and weapon system managers to make better-informed implementation decisions on stockpile surety improvement options.

Surety Technologies activities include:
Major Projects – Directed, high priority, and integrated research and development (R&D) efforts to support timely availability of advanced safety and security options for the stockpile. These are projects, usually multi-site, that are easily defined and required to integrate with entities outside the Surety Technologies program. They also have defined requirements for technology development and are held to integrated schedules. Major Projects represent a concerted effort by the Surety Technologies program to ensure novel technologies are properly integrated with and across programs and sites, leading to a high probability of achieving sufficient maturity for stockpile insertion.

Technology Development – Advanced safety and security projects meant to advance the state of the art and to improve the building blocks of the Surety Technologies program. These efforts are technology-focused and are not held to a development schedule but to an integrated schedule or to commitments with outside entities. Technology Development projects form the base from which Major Projects draws to create new, integrated technologies for the stockpile.

- Utility Development – Development of utility systems for the stockpile, a security related field.
- Power Development – Development of power systems for the stockpile, a security related field. Focuses on novel power solutions as well as improvements to current systems.
- Multipoint Safety Development - Development of multiple safety systems for the stockpile, a safety related field. Focuses on novel safety solutions as well as improvements to current systems.
- Explosives Development - Development of novel use cases for HE systems for the stockpile, a safety related field. Focuses on novel applications of HE as well as their manufacture.
- Generational Development - Development of novel use cases for next-generation systems for the stockpile, a security related field.
- Electromechanical Development – Development of electronic, mechanical, and electromechanical systems for the stockpile, a safety related field.
- Sensor Development - Development of sensor components systems for the stockpile, a security related field.

Architecture Development and Integration: Activities related to the state-of-the-art technology reviews for weapon applications as well as proposal for new subsystem architecture utilizing features form the technology development framework. These are classified and contained in the classified appendix.

Program Management: Activities related to administrative and program management costs to ensure project solvency based on priorities and emerging challenges.

Highlights of the FY 2024 Budget

- Test and evaluate optical initiation fire sets and support the Optical Initiation Technology Realization Team, a collaborative effort between the laboratories and plants created to ensure the successful rapid maturation of optical initiation fire sets as that technology eventually transitions to production and insertion into the next weapons systems.
- Continue development of advanced safety mechanisms and demonstrate technologies on the next appropriate demonstrator.
- Integrate novel technologies into safety architectures that minimize/eliminate issues with inadvertent electrical transmission.
- Construct prototype power management technologies tailored to modernized applications.
- Develop graded surety architecture suites to address emergent needs of the stockpile.

FY 2025 – FY 2028 Key Milestones

- Demonstrate a mature optical initiation system, TRL 5 & MRL 3, for next insertion option such as the next Navy warhead.
- Continue development of improved power management technologies tailored to modernized applications.
- Deploy advanced safety mechanisms and demonstrate technologies on a relevant demonstrator.
- Build proof-of-concept demonstrators of improved safety architectures that minimize/eliminate issues with inadvertent electrical transmission.
- Construct novel surety architectures test articles to address emergent needs.

FY 2022 Accomplishments

- Completed the integration of the requisite hardware for a full-scale demonstration of the optical initiation system on a ground-based demonstration with full functionality.
- Stood up advanced manufacturing capabilities in support of Next Gen development.
- Provided surety related support to the U.S.-UK Joint Technology Demonstrator project for their ground test unit.
- Completed preliminary studies of current iteration Multipoint Safety (MPS) concepts technologies compatibility.
- Completed a tri-lab surety roadmap sufficient to accomplish the surety requirements in the new DOE Order 452.1E.
- Integrated specialized memory chipsets into a use-control design concept that will allow for unique control concepts.

Surety Technologies
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Surety Technologies $50,617,000	**Surety Technologies $50,000,000**	**Surety Technologies -$617,000**
• Develop certain surety options for future weapons systems, in accordance with the tri-lab surety roadmap, to meet threshold and objective surety requirements as defined in DOE Order 452.1E. • Establish TRL 5 and MRL 3 for the optical initiation system intended for insertion into the next available warhead. • Continue support the Optical Initiation Technology Realization Team. • Continue to develop advanced safety mechanisms and demonstrate technologies on the next demonstrator. • Continue to develop improved safety architectures that minimize/eliminate issues with inadvertent electrical transmission. • Develop a down-selected set of power management technologies tailored to modernized applications. • Mature to TRL 5 and MRL 3 an all-electrical firing set as a backup to optical initiation technology.	• Improve the safety, security, and use control, while preventing denial, of the U.S. nuclear deterrent by developing innovative, cost-effective solutions for Life Extension Programs (LEPs) and future weapon systems. • Mature advanced safety concepts and use control options that reduce impact to the production agency. • Develop advanced low-cost use control integrated with current physical security and adaptable to the enduring stockpile. • Demonstrate technologies in time for consideration by the W93. • Test and evaluate optical initiation systems and support the Optical Initiation Technology Realization Team. • Continue development of advanced safety mechanisms and demonstrate technologies on the next appropriate demonstrator. • Integrate novel technologies into improved safety architectures that minimize/eliminate issues with inadvertent electrical transmission. Construct prototype improved power management technologies tailored to modernized applications.	• The decrease reflects the prioritization of safety related technology development, such as Optical Initiation, over weapons use control and security technologies development.

Weapon Technology and Manufacturing Maturation
Weapon Technology Development

Description

Weapon Technology Development (WTD) is responsible for developing technology options that are responsive to changing global security environments and for activities that reduce risk and increase the likelihood of insertion of those technologies into the stockpile. The focus of WTD is to improve existing capabilities, provide solutions for addressing capability gaps and shortfalls, evolve capabilities to meet emerging threats and changing policy, and utilize improved technologies and methods to reduce lifecycle costs.

WTD funds activities for the research, development, engineering, integration, and demonstration of technologies that enable the performance, reliability, safety, and responsiveness of current and future stockpile. This includes early-stage development and testing of weapon components targeted to replace sunset technologies and modernize subsystems. This is defined as components facing performance, aging, and/or security issues that can have negative impacts on the performance and safety of a weapon.

Highlights of the FY 2024 Budget

- Develop a distributed bus-based architecture (DBBA) to enable greater system flexibility and component re-use across the stockpile.
- Continue development of field programmable gate arrays and radiation hardened microelectronics used to provide arming, fuzing, firing, and other functions within nuclear weapons.
- Mature advanced power source technologies to support future tactical and strategic weapon system LEP insertions, including mature explosive materials, initiation systems, and detonators technologies.
- Develop and improve Neutron Generator (NG) technologies to offset aging effects.
- Continue development efforts for long-life Gas Transfer System (GTS) design options.
- Research and develop next-generation components and materials required to ensure safety, security, reliability, and performance of aging Nuclear Explosive Packages (NEPs).
- Complete efforts with the UK on Joint Technology Demonstrator (JTD) as a strategic collaboration focusing on design and development of new technologies.
- Collaborate with Navy Strategic Systems Programs (SSP) partners and others on future flight opportunities in realistic environments for the Reentry Experiments Development Initiative (REDI).
- Continue support for the Air Force focused demonstrator programs to mature technologies for future Air Force systems.

FY 2025 – FY 2028 Key Milestones

- Development and transition of a modular and adaptable architecture with enhanced capabilities to the next program of record that result in a nuclear stockpile able to respond quickly and easily to changing policy, technology, and threat environments.
- Field Programmable Gate Array (FPGA) fabrication and programming software trust certification completion and achievement of TRL 5. Static Random-Access Memory (SRAM) and Dragonfly processor sample parts available to customers for transition.
- Development and transition of a novel high explosive (HE) formulation with attractive performance characteristics to the next program of record.
- Development and transition of an electronic neutron generator (ELNG) that will provide cost savings in testing and production.
- Investigation and investment in exploratory R&D and technology development options for future Programs of Record.
- Collaborate with Navy SSP partners and others to field the Reentry Experiments Development Initiative (REDI) flight(s).
- Collaborate with the Air Force on demonstrator programs to mature technologies for future Air Force systems.

FY 2022 Accomplishments

- Work accomplished within JTD includes the design and testing of the Ground Test 4 (GT4) unit, development of a test bed to enable joint testing of physics designs to inform future systems, collaboration with the UK to characterize replacement material, design for a mass mock nuclear explosive package, and completion of mount designs.
- Achieved TRL 5 and MRL 3 for the thermal spray technology, which is an option for future systems.
- Continued development of key technologies for potential options for the W87-1 and the W93 including neutron generators, gas transfer system (GTS) components, joint test assembly (JTA) telemetry and firing set capacitors, radiation-hardened high voltage diodes, and sprytrons.
- The Electronic Parts Program (EPP) delivered list of parts impacted by supply shortages, particularly those caused by recent events, to programs of record; procurements underway. The EPP team populated >11K manufacturer name and orderable part numbers in Enterprise Resource Planning (ERP).
- Made Dragonfly processor sample parts and SRAM available for further testing and development.
- Completed the design and integration of technologies for the NNSA-Air Force demonstrator initiative (ANDI), executed the test from Vandenberg Space Force Base.
- The sixth HOT Shot demonstrator flight was successfully launched, progressing the TRLs of: Power Bus, Hardened Data Recorder, Ultrasonic Launch Accelerometers, and Micro Firing Set (μFS).
- Initiated a Technology Realization Team (TRT) for CMOS8 technology, which is required to implement trusted and strategic radiation hardened (TSRH) Field Programmable Gate Arrays (FPGA), more advanced microprocessors, larger density memory products, and enhanced security features.

Weapon Technology Development
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Weapon Technology Development $128,547,000	**Weapon Technology Development $140,000,000**	**Weapon Technology Development +$11,453,000**
• Continue development of modular and adaptable architectures with enhanced capabilities that result in a nuclear stockpile able to respond quickly and easily to changing policy, technology, and threat environments. • Continue development of a distributed bus-based architecture (DBBA) to enable greater component re-use across the stockpile. • Develop field programmable gate arrays and radiation hardened microelectronics used to provide arming, fuzing, firing, and other functions within nuclear weapons. • Advance development efforts for long-life GTS design options. • Continue research and development of next-generation components and materials required to ensure safety, security, reliability, and performance of aging Nuclear Explosive Packages (NEPs). • Pursue development and testing of advanced thermal batteries, launch accelerometers, and replacement inertial sensor technologies. • Advance an electronic neutron generator (ELNG) for future system insertion to enable reduced costs. Continue development of options for positional aware fuzing. • Maintain efforts with the UK on JTD as a strategic collaboration focusing on design and development of new technologies.	• Mature responsive and agile sub-system and component technologies for insertion into the W93 and future systems. • Improve existing capabilities, provide solutions for addressing capability gaps and shortfalls, evolve capabilities to meet emerging threats and changing policy, and use improved technologies and methods to reduce lifecycle costs. • Develop a distributed bus-based architecture (DBBA) to enable greater system flexibility and component re-use across the stockpile. • Continue development of field programmable gate arrays and radiation hardened microelectronics used to provide arming, fuzing, firing, and other functions within nuclear weapons. • Mature advanced energetics technologies to support future weapon system insertions, including mature explosive materials, initiation systems, and detonators technologies. • Develop and improve neutron generator and gas transfer system technologies to offset aging effects. • Pursue demonstrator opportunities with the Navy and Air Force.	• The increase reflects additional scope in: Robust development of microelectronics including CMOS8, enabling field-programming, faster processing, and reduced power consumption. • Continued leveraging of Joint Technology and system demonstrators to mature novel innovations across the technology maturation portfolio. • Boost in development of novel and innovative weapons components, capabilities, and architectures to enable more agile, less cost, and streamlined complex. • Continued execution of the Electronic Parts Program providing a front-end assurance capability for the enterprise's microelectronics. • Maturation of the Distributed Bus-Based Architecture increasing agility and flexibility in future components and future weapon systems and reduction in qualification times.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Pursue further collaboration with Navy Strategic Systems Programs (SSP) partners and others on future flight opportunities in realistic environments for the Reentry Experiments Development Initiative (REDI). • Continue collaboration with the Air Force on the Continuous Demonstrator for Operational Responsiveness (ConDOR).		

Weapon Technology and Manufacturing Maturation
Advanced Manufacturing Development

Description
The mission of the Advanced Manufacturing Development (AMD) program is to rapidly develop and deploy advanced manufacturing solutions to both existing, known problems and have manufacturing technologies and capabilities to rapidly recover from unforeseen problems. AMD directly benefits the future agility and responsiveness of the National Nuclear Security Administration's manufacturing infrastructure by providing capable, efficient, and effective manufacturing solutions to address technical issues, replace obsolete processes, and anticipate solutions to future challenges.

In pursuing the long-term advanced manufacturing strategy, this program prioritizes developing improvements that demonstrate viability for a particular application, which allows future weapon modernization efforts to incorporate those production methods with confidence to meet program requirements, costs, and schedule. The new production processes that AMD identifies and opts to mature can improve component performance, shorten production schedules, and design cycles, reduce facility footprint, avoid compliance issues, and lower life-cycle costs. The AMD program maintains awareness of emerging manufacturing technologies, assessing and tailoring new manufacturing processes emerging from the industrial and academic sectors to the unique materials and qualification standards required for nuclear weapons.

Highlights of the FY 2024 Budget
- Demonstrate additive manufacturing for thermosets enabling added design flexibility for low-cost, lightweight structural components.
- Mature coating manufacturing technologies in time to meet emerging stockpile needs.
- Develop material recyclability processes to reuse scrap material and reduce supply chain risk.
- Develop capabilities for predictive simulation across a wide spectrum of manufacturing processes growing the depth and breadth of predictive simulation to enable efficient decision making and manufacturing processes maturation.
- Finalize maturation of production methods for new strategically radiation-hardened complementary metal oxide semiconductions (CMOS8) to enable new system architectures.
- Develop near net shaping capability of Lithium component forming to increase material efficiency and stretch the available inventory.
- Mature additive manufacturing of pads and cushions to improve component performance and establish efficient and effective processes to meet a wide variety of stockpile requirements.
- Improve process monitoring capabilities and automated on-machine metrology of novel manufacturing capabilities to reduce time to qualify current and next-generation components.
- Dynamic testing of Additive Manufacturing High Explosive technologies for stockpile boosters.
- Develop a system for improving timeliness of cable connector specification and manufacturing.
- Improve upon spatial tolerances, residual stress reduction, and qualification of laser powder bed fusion technology to demonstrate the potential to supplement production capabilities for near term programs of record.

FY 2025 – FY 2028 Key Milestones
- Develop and demonstrate various techniques and approaches for cost effective rapid prototyping in support of both basic research and development and stockpile systems programs.
- Advance additive capabilities for a broad spectrum of components while also developing a fundamental understanding of the differences between legacy materials and additive materials to broaden the application of additive manufacturing across the enterprise.
- Transition next-generation CMOS8 strategically radiation-hardened microelectronics manufacturing process to the Non-Nuclear Component Program Office and program of record.
- Transition additive manufacturing for thermosets enabling added design flexibility for low-cost light weight structural components.
- Establish the readiness to use additive manufacturing for a range of metal components in the stockpile.
- Develop paths to certification and qualification for new components and materials produced via advanced and novel manufacturing techniques.

- Finalize the transition of additive manufacturing technologies for pads and cushions to modernization programs enabling significant gains in efficiency, performance, and effective use of production floor space at KCNSC.
- Further develop, scale-up, and demonstrate additive manufacturing and particle injection molding of high explosives which may offer advantages in component performance and efficiencies in manufacturing compared to legacy manufacturing processes.
- Transition coating technologies, able to meet stockpile requirements, to modernization programs.
- Capitalize on in-situ diagnostic data for feedback into manufacturing processes as a means of faster acceptance and component qualification.
- Transition a complete system for cable connector specification to modernization programs to increase efficiencies over current cable connector design to manufacturing timescales.
- Transition methods improving existing manufacturing technologies to production modernization to eliminate component manufacturing risk before stockpile insertion.
- Transition technologies for conserving at-risk materials and replacing obsolete materials.
- Accelerate maturation the most promising novel transformational manufacturing processes that address current enterprise production issues and anticipate solutions to future challenges.
- Transition near net shaping capability of lithium components forming to increase material efficiency and stretch the available inventory.
- Develop capabilities for predictive simulation, at both the plants and laboratories, across a wide spectrum of manufacturing processes to enable efficient decision making and manufacturing processes maturation.

FY 2022 Accomplishments

- Advanced additive manufacturing capabilities for pads and cushions, thermoplastics, high explosives, and chip slappers while also developing fundamental knowledge of additive metal materials properties and postprocessing to broaden the application of additive manufacturing across the enterprise.
- Additively manufactured and characterized thermoset test articles meeting potential modernization program requirements.
- Significantly matured CMOS8 process modules by converting 60% of engineering steps to standard operating codes and hitting all schedule fabrication targets.
- Developed capabilities for predictive simulation across a wide spectrum of manufacturing processes to enable efficient decision making and manufacturing processes maturation.
- Matured the thermal spray process, specifically the Controlled Atmospheric Plasma Spray, in time for consideration by upcoming modernization programs.
- Transitioned a slick coating manufacturing method for pads and cushions that meets stockpile specifications to modernization programs.
- Demonstrated a candidate automated, integrated method that could be used to realize machine qualified 3D pads and cushions.
- Performed testing of gas transfer system component materials to improve recovery of non-nuclear component materials, informing the potential for material reuse and minimization of supply chain risk for new gas transfer components.
- Produced high explosive mock materials via solid compounding and particle injection molding and evaluated these manufacturing methods for their potential to replace legacy processes, reduce hazardous waste, and reduce personnel exposure during hazardous tasks.
- Matured an advanced manufacturing technology for special materials able to meet stockpile requirements and transitioned this technology to production modernization to reduce personnel exposure to hazardous materials.

Advanced Manufacturing Development
Activities and Explanation of Changes

<table>
<tr><th>FY 2023 Enacted</th><th>FY 2024 Request</th><th>Explanation of Changes
FY 2024 Request vs
FY 2023 Enacted ($)</th></tr>
<tr><td>Advanced Manufacturing Development
$107,001,000</td><td>Advanced Manufacturing Development
$137,745,000</td><td>Advanced Manufacturing Development
+$30,744000</td></tr>
<tr><td>

Advance certification and qualification methods, like integrated computational materials engineering and in-situ diagnostics, to widen the use of AM-produced parts in the active stockpile.
Further mature AM Pads and Cushions capability and facilitate the technology transfer between LLNL, LANL, and KCNSC.
Improve confidence in next-generation digital manufacturing methods through use of computational simulations and model-based designs.
Advance manufacturing readiness level of new strategically radiation-hardened microelectronics production capabilities to enable new systems architectures and mature interconnect technologies for heterogeneous integration.
Continue development of new energetic materials formulations that are safer to produce and replace legacy materials that are no longer commercially available.
Improve upon spatial tolerances, residual stress reduction, and qualification of laser powder bed fusion technology to demonstrate the potential to supplement production capabilities for near term programs of record.
Complete and down-select a methodology for inspecting and certifying AM for metal lattices.

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Identify and mature additional novel production methods that anticipate and directly address enterprise production challenges.
Improve existing technologies and processes to decrease production costs, improve agility and throughput, and decrease production time and waste. The objective is to reduce or eliminate component manufacturing risk before transition and stockpile insertion.
Pursue alternatives for replacing obsolete or hazardous materials, including new approaches designed to better conserve materials that are scarcely available, are challenging to produce, or have at-risk supply chains.
Develop capabilities for rapid design, synthesis, and scale up of new materials as well as increase knowledge of current materials and data curation.
Expand the application space of additive manufacturing as well as build the tools, materials, and expertise to overcome barriers to wider applications across the enterprise.
Strengthen predictive simulation and data analytics capabilities for manufacturing processes, substantially augmenting the enterprise's capabilities to rapidly mature manufacturing processes and produce acceptable stockpile components.

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The increase reflects projects that will:

Improve existing technologies and processes to decrease production costs, improve agility and throughput, and decrease production time and waste in order to is reduce or eliminate component manufacturing risk before transition and stockpile insertion.
Pursue alternatives for replacing obsolete or hazardous materials, including new approaches designed to better conserve materials that are scarcely available, are challenging to produce, or have at-risk supply chains.
Develop capabilities for rapid design, synthesis, and scale up of new materials as well as increase knowledge of current materials and data curation.
Advance the science basis for manufacturing processes to improve manufacturing efficiencies and ease component qualification.
Identify and mature a wide spectrum of novel transformational manufacturing options that directly address current enterprise production issues and anticipate solutions to future challenges
Ensure a suite of manufacturing technologies are matured and are available on future programs of record.

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</table>

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Continue development of AM for printed electronics and identify new insertion opportunities. • Advance development of AM processes for thermal spray coatings. • Continue to develop testing of advanced methods for high explosives manufacture with improved safety margins over conventional HE and better performance than insensitive HE. • Continue process scaleup of additively manufactured and injection molded HE and mock. • Develop material recycling processes to create feedstock for AM. • Leverage embedded sensors to study long-term aging effects of AM materials and components. • Continue development of polymer and metal AM topology optimization to improve high fidelity mechanical mock flight tests and further tailor to future system requirements. • Advance development of next-generation CMOS8 trusted, strategically radiation-hardened microelectronics manufacturing process technology. • Develop near net shaping capability of Lithium component forming to increase material efficiency and stretch the available inventory.	• Ensure a suite of manufacturing technologies are matured and are available on future programs of record. • Advance the science basis for manufacturing processes to improve manufacturing efficiencies and ease component qualification. • Develop and harness the power of digital manufacturing, including next generation characterization, inspection, and process aware diagnostics, to enable efficient deployment of production ready manufacturing processes.	

Stockpile Research, Technology, and Engineering
Academic Programs and Community Support (formerly Academic Programs)

Overview
Starting in FY 2024, funding for these programs is requested under the Academic Programs and Community Support. NNSA is proposing to elevate Academic Programs and Community Support from a congressional control level within SRT&E to a stand-alone GPRA Unit/control level. This budget structure change is consistent with the President's goals of advancing equity and racial justice through the federal government and the change addresses strategic challenges in NNSA's workforce.

Please refer to details on Academic Programs and Community Support.

Stockpile Research, Technology, and Engineering
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC	N/A	N/A	60,096	64,483	68,932	+4,449
Time-resolved Material Diffraction Diagnostics on NIF, LLNL	5,300	0	5,300	0	0	0
Subnanosecond laser replacement, LLNL	8,000	0	8,000	0	0	0
Commodity Technology System (CTS) 2, LLNL (previously CTS-2)[a]	70,000	0	10,000	20,000	20,000	+0
El Capitan (ATS-4), LLNL	600,000	179,000	125,000	90,000	130,000	+40,000
Target and Beam Alignment System Replacement (formerly Target Alignment Sensor Upgrade), LLNL	11,000	0	0	11,000	0	-11,000
Unclassified El Capitan-like System (ATS-4), LLNL	19,700	0	0	200	3,900	+3,700
Cryogenic Magnetized Targets, LLNL	12,000	0	2,000	10,000	0	-10,000
Target Line Replacement Unit (LRU), LLNL	6,900	0	0	0	6,900	+6,900
Energy upgrade to OTS Laser, LLNL	6,000	0	0	0	0	0
IT Infrastructure Redundancy, LLNL	5,595	0	0	5,595	0	-5,595
Time Resolved Magnetic Recoil Spectrometer, LLNL	6,000	0	0	0	6,000	+6,000
Final Optic Damage Inspection System Replacement, LLNL	12,200	0	0	0	12,200	+12,200
Polar Diagnostic Instrument Manipulator Replacement, LLNL	19,400	0	0	0	0	0
Chamber Image Viewing System Recapitalization, LLNL	9,700	0	0	9,700	0	-9,700
Dynamic Materials Properties Laser (DMPL, formerly Long Pulse Laser @ XFEL), SLAC	135,100	0	0	0	0	0
Advanced Sources and Detector, LANL	1,800,000	391,807	174,685	247,065	279,601	+32,536
Crossroads (ATS-3) System, LANL	115,000	81,000	14,000	8,000	6,000	-2,000

[a] Each year a useful system (asset) is purchased.

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
ATS-5 System, LANL	250,000	0	0	0	30,000	+30,000
U1a Optical Velocimetry Diagnostics, NNSS	10,000	0	10,000	0	0	0
Non-Radiographic diagnostics and controls for the Scoprios Test Bed, NNSS	18,900	0	0	0	0	0
Commodity Technology System (CTS) 2, SNL[a]	20,000	0	5,000	5,000	5,000	0
ATS-Application Regression Testbed (ART) System - El Capitan, SNL	16,400	0	0	5,800	5,300	-500
Automated Refurbishment of Magnetically Insulated Transmission Line (MITL) Surfaces (ARMS), SNL	15,400	0	0	0	6,200	+6,200
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**414,081**	**476,843**	**580,033**	**+103,190**

[a] Each year a useful system (asset) is purchased.

Outyears for Capital Equipment Summary

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
	($K)				
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	72,131	73,646	75,192	76,771	N/A
Commodity Technology System (CTS) 2, LLNL	20,000	0	0	0	0
El Capitan (ATS-4), LLNL	76,000	0	0	0	0
Unclassified El Capitan-like System (ATS-4), LLNL	3,900	3,900	3,900	3,900	0
Energy upgrade to OTS Laser, LLNL	6,000	0	0	0	0
Polar Diagnostic Instrument Manipulator Replacement, LLNL	19,400	0	0	0	0
Dynamic Materials Properties Laser (DMPL, formerly Long Pulse Laser @ XFEL), SLAC	82,411	0	18,914	0	33,775
Advanced Sources and Detector, LANL	348,528	215,718	87,132	55,464	0
Crossroads (ATS-3) System, LANL	6,000	0	0	0	0
ATS-5 System, LANL	50,000	62,500	62,500	20,000	25,000
Non-Radiographic diagnostics and controls for the Scoprios Test Bed, NNSS	18,900	0	0	0	0
Commodity Technology System (CTS) 2, SNL	5,000	0	0	0	0
ATS-Application Regression Testbed (ART) System - El Capitan, SNL	5,300	0	0	0	0
Automated Refurbishment of Magnetically Insulated Transmission Line (MITL) Surfaces (ARMS), SNL	9,200	0	0	0	0
Total, Capital Equipment (including MIE)	**722,770**	**355,764**	**247,638**	**156,135**	**N/A**

Stockpile Research, Technology, and Engineering
Construction Project Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
27-D-XXX, Combined Radiation Effects Survivability Testing, SNL						
TEC	1,531,000	0	0	0	0	0
OPC	571,965	6,000	6,000	33,000	29,000	-4,000
TPC, 27-D-XXX, Combined Radiation Effects Survivability Testing, SNL	**2,102,965**	**6,000**	**6,000**	**33,000**	**29,000**	**-4,000**
24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS						
TEC[a]	122,946	18,754	12,736	12,956	78,500	+65,544
OPC	2,515	1,015	0	0	1,500	+1,500
TPC, 24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS	**125,461**	**19,769**	**12,736**	**12,956**	**80,000**	**+67,044**
18-D-620, Exascale Computing Facility Modernization Project, LLNL						
TEC	105,200	105,200	0	0	0	0
OPC	6,000	5,000	1,000	0	0	0
TPC, 18-D-620, Exascale Computing Facility Modernization Project, LLNL	**111,200**	**110,200**	**1,000**	**0**	**0**	**0**
17-D-640, U1a Complex Enhancements Project (UCEP), NNSS						
TEC	596,983	249,200	135,000	53,130	126,570	+73,440
OPC[b]	9,872	6,309	410	0	0	0
TPC, 17-D-640, U1a Complex Enhancements Project (UCEP), NNSS	**606,855**	**255,509**	**135,410**	**53,130**	**126,570**	**+73,440**
Total, Stockpile Research, Technology, and Engineering						
TEC	2,356,129	373,154	147,736	66,086	205,070	+138,984
OPC	590,352	18,324	7,410	33,000	30,500	-2,500
TPC Total, Stockpile Research, Technology, and Engineering	**2,946,481**	**391,478**	**155,146**	**99,086**	**235,570**	**+136,484**

[a] Pursuant to 50 U.S.C. 2743(c), NNSA will not obligate more than $30 million of TEC funding until formal submission to the congressional defense committees of a report explaining the reasons for the cost variation above the Minor Construction threshold.
[b] U1a Complex Enhancements Project OPCs are funded under Enhanced Capabilities for Subcritical Experiments within the Assessment Science Program.

Outyears for Construction Project Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
25-D-XXX, Combined Radiation Effects Survivability Testing, SNL					
TEC	0	0	150,000	200,000	1,181,000
OPC	38,000	59,000	50,000	22,000	328,965
TPC, 25-D-XXX, Combined Radiation Effects Survivability Testing, SNL	**38,000**	**59,000**	**200,000**	**222,000**	**1,509,965**
24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS					
TEC	0	0	0	0	0
OPC	0	0	0	0	0
TPC, 24-D-513, ZEUS Test Bed (ZTB) Facilities Improvement, NNSS	**0**	**0**	**0**	**0**	**0**
18-D-620, Exascale Computing Facility Modernization Project, LLNL					
TEC	0	0	0	0	0
OPC	0	0	0	0	0
TPC, 18-D-620, Exascale Computing Facility Modernization Project, LLNL	**0**	**0**	**0**	**0**	**0**
17-D-640, U1a Complex Enhancements Project (UCEP), NNSS					
TEC	33,083	0	0	0	0
OPC	3,153	0	0	0	0
TPC, 17-D-640, U1a Complex Enhancements Project (UCEP), NNSS	**36,236**	**0**	**0**	**0**	**0**
Total, Stockpile Research, Technology, and Engineering					
TEC	33,083	0	150,000	200,000	1,181,000
OPC	41,153	59,000	50,000	22,000	328,965
TPC Total, Stockpile Research, Technology, and Engineering	**74,236**	**59,000**	**200,000**	**222,000**	**1,509,965**

17-D-640, U1a Complex Enhancements Project (UCEP)
Nevada National Security Site (NNSS), Mercury, Nevada
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2024 Request for the U1a Complex Enhancements Project (UCEP) is $126,570,000. The FY 2024 request will continue construction activities and initiate startup and testing of the equipment and subsystems.
Two recent Critical Decisions were approved for UCEP. The CD-2/3 for Subproject 17-D-640-020, *Enhanced Capabilities for Subcritical Experiments (ECSE) Laboratory and Support Infrastructure*, was approved on June 23, 2022. The Total Project Cost (TPC) is $610,172,000 and the CD-4, *Approve Start of Operations or Project Completion*, is the first quarter of FY 2027. The current baselined TPC of the UCEP project is $610,172,000. Funding in future budget requests will be evaluated to account for the actual costs to complete subproject 010 and to align funding to executability in subproject 020.

Subproject 17-D-640-010 *ECSE Access and Life Safety infrastructure* was completed (CD-4 approved) on June 30, 2022.

A Federal Project Director has been assigned to this project.

Significant Changes:

The following are the changes from the previous version:
1. The baseline for Subproject 17-D-640-020 was approved on June 23, 2022.
2. The estimate and funding have been revised to reflect additional work necessary to upgrade the existing experiment area structure to meet nuclear safety requirements, and redesign the containment plugs to revised failure analysis of the Subcritical Experiment vessel.
3. The estimate and funding have been revised to reflect additional risk associated with supply chain and global economic environment identified by the External Independent Review team.
4. The FY 2024 FYNSP currently includes less funding than the baselined TPC for the project. Funding in future budget requests will be evaluated to account for the actual costs to complete subproject 010 and to align funding to executability in subproject 020.
5. Subproject 17-D-640-010 received CD-4 approval on June 30, 2022, on budget and over a year ahead of schedule.

Critical Milestone History

17-D-640: Total Project

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	9/25/2014	8/13/2015	1QFY2017	1QFY2019	2QFY2019	3QFY2019	N/A	3QFY2022
FY 2018	9/25/2014	8/13/2015	3QFY2017	4QFY2019	2QFY2019	4QFY2019	N/A	2QFY2023
FY 2019	9/25/2014	8/13/2015	08/09/2017	4QFY2019	2QFY2019	4QFY2019	N/A	2QFY2023
FY 2020	9/25/2014	8/13/2015	08/09/2017	2QFY2020	4QFY2019	2QFY2020	N/A	4QFY2025
FY 2021	9/25/2014	8/13/2015	08/09/2017	1QFY2021	3QFY2020	1QFY2021	N/A	4QFY2025
FY 2022	9/25/2014	8/13/2015	08/09/2017	4QFY2021	2QFY2021	4QFY2021	N/A	1QFY2026
FY 2023	9/25/2014	8/13/2015	08/09/2017	3QFY2022	3/11/2022	3QFY2022	N/A	1QFY2027
FY 2024	9/25/2014	8/13/2015	08/09/2017	06/23/2022	3/11/2022	06/23/2022	N/A	1QFY2027

17-D-640-010: ECSE Access and Life Safety Infrastructure

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	9/25/2014	8/13/2015	1QFY2017	3QFY2017	4QFY2017	4QFY2017	N/A	2QFY2019
FY 2018	9/25/2014	8/13/2015	3QFY2017	2QFY2018	1QFY2018	2QFY2018	N/A	3QFY2020
FY 2019	9/25/2014	8/13/2015	08/09/2017	2QFY2019	3QFY2018	2QFY2019	N/A	2QFY2021
FY 2020	9/25/2014	8/13/2015	08/09/2017	2QFY2019	7/11/2018	2QFY2019	N/A	4QFY2023
FY 2021	9/25/2014	8/13/2015	08/09/2017	03/27/2019	7/11/2018	03/27/2019	N/A	4QFY2023
FY 2022	9/25/2014	8/13/2015	08/09/2017	03/27/2019	7/11/2018	03/27/2019	N/A	3QFY2022
FY 2023	9/25/2014	8/13/2015	08/09/2017	03/27/2019	7/11/2018	03/27/2019	N/A	4QFY2023
FY 2024	9/25/2014	8/13/2015	08/09/2017	03/27/2019	7/11/2018	03/27/2019	N/A	06/30/2022

17-D-640-020: ECSE Laboratory and Support Infrastructure

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2017	9/25/2014	8/13/2015	1QFY2017	1QFY2019	2QFY2019	3QFY2019	N/A	3QFY2022
FY 2018	9/25/2014	8/13/2015	3QFY2017	4QFY2019	2QFY2019	4QFY2019	N/A	2QFY2023
FY 2019	9/25/2014	8/13/2015	08/09/2017	4QFY2019	2QFY2019	4QFY2019	N/A	2QFY2023
FY 2020	9/25/2014	8/13/2015	08/09/2017	2QFY2020	4QFY2019	2QFY2020	N/A	4QFY2025
FY 2021	9/25/2014	8/13/2015	08/09/2017	1QFY2021	3QFY2020	1QFY2021	N/A	4QFY2025
FY 2022	9/25/2014	8/13/2015	08/09/2017	4QFY2021	2QFY2021	4QFY2021	N/A	1QFY2026
FY 2023	9/25/2014	8/13/2015	08/09/2017	3QFY2022	3/11/2022	3QFY2022	N/A	1QFY2027
FY 2024	9/25/2014	8/13/2015	08/09/2017	06/23/2022	3/11/2022	06/23/2022	N/A	1QFY2027

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3A – Approve Site Preparation
CD-3B – Approve Site Preparation
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout
Separate documentation will be submitted for combined CD-2/3 for each subproject

17-D-640-020: ECSE Laboratory and Support Infrastructure

Fiscal Quarter or Date

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3B
FY 2021	1QFY2021	3QFY2020	N/A
FY 2022	4QFY2021	3QFY2021	N/A
FY 2023	6/23/2022	7/7/2021	8/30/2021

CD-3A – Site Preparation

CD-3B – Site Preparation

Project Cost History ($K)

17-D-640: Total Project

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	14,200	137,300	151,500	7,109	N/A	7,109	158,609
FY 2018	14,200	137,300	151,500	7,109	N/A	7,109	158,609
FY 2019	19,900	131,600	151,500	7,109	N/A	7,109	158,609
FY 2020	14,856	148,144	163,000	11,809	N/A	11,809	174,809
FY 2021	38,916	468,284	507,200	19,309	N/A	19,309	526,509
FY 2022	70,756	436,444	507,200	19,309	N/A	19,309	526,509
FY 2023	106,863	460,337	567,200	9,672	N/A	9,672	576,872
FY 2024	104,027	496,756	600,783	9,372	N/A	9,372	610,155

17-D-640-010: ECSE Access and Life Safety Infrastructure

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	2,700	23,940	26,640	981	N/A	981	27,621
FY 2018	2,700	23,940	26,640	981	N/A	981	27,621
FY 2019	8,400	38,240	46,640	981	N/A	981	47,621
FY 2020	3,356	44,784	48,140	1,981	N/A	1,981	50,121
FY 2021	3,356	44,784	48,140	1,981	N/A	1,981	50,121
FY 2022	3,356	46,074	49,430	1,398	N/A	1,398	50,828
FY 2023	3,356	45,374	48,730	1,391	N/A	1,391	50,121
FY 2024	3,356	45,374	48,730	1,391	N/A	1,391	50,121

17-D-640-020: ECSE Laboratory and Support Infrastructure

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2017	11,500	113,360	124,860	6,128	N/A	6,128	130,988
FY 2018	11,500	113,360	124,860	6,128	N/A	6,128	130,988
FY 2019	11,500	93,360	104,860	6,128	N/A	6,128	110,988
FY 2020	11,500	103,360	114,860	9,828	N/A	9,828	124,688
FY 2021	35,560	423,500	459,060	17,328	N/A	17,328	476,388
FY 2022	67,400	390,370	457,770	17,911	N/A	17,911	475,681
FY 2023	103,507	414,963	518,470	8,281	N/A	8,281	526,751
FY 2024	100,671	451,382	552,053	7,981	N/A	7,981	560,034

2. Project Scope and Justification

Scope

UCEP will perform mining and provide the supporting structures, systems, and components necessary to deploy the large Major Items of Equipment (MIE) diagnostic systems and experiments. The existing U1a Complex orthogonal U1a.100 and U1a.104 drifts will be used to minimize the need for new mining.

17-D-640-010 includes the design, mining, fabrication, construction, installation, and commissioning of the underground areas and systems in the U1a Complex to provide accessibility, a refuge station, adequate ventilation, and construction power for the ensuing subproject 17-D-640-020. This subproject is required to support any significant construction activity in the eastern portion of the U1a Complex. While driven by the same mission in the ECSE subprogram, it is a subproject that can be designed and completed separately from the other subproject.

17-D-640-020 includes the design, mining, fabrication, construction, installation, and commissioning of the ECSE Area and systems to provide MIE diagnostic/detector alcove drifts and mechanical equipment drifts. Also included are safety basis and readiness activities. The project underground scope includes an experimental room with containment plugs for experiment execution, process control system, safety interlock system, diagnostic clean rooms and diagnostic infrastructure, and ancillary systems (overhead handling systems, power, cooling, ventilation, process water and oil, instrument air, spill mitigation, and shielding). This subproject includes a CD-3A and CD-3B for site preparation. The CD-3A scope is site preparation underground and the new borehole with a total cost of $37.5M and a scheduled completion of 4Q/FY 2023. The CD-3B scope is site preparation above ground for lay down yard/construction trailers and relocation of existing facility infrastructure with a total cost of $10.4M and a scheduled completion of 1Q/FY 2023.

Justification

DOE Order 413.3B Critical Decision, *CD-0 Approve Mission Need,* was approved on September 25, 2014, for the "Enhanced Capabilities for Subcritical Experiments (ECSE) at the Nevada National Security Site, U1a Complex." On November 4, 2015, the intersection of the U1a.100 and U1a.104 Drifts within the U1a Complex at the Nevada National Security Site was determined to be the only viable location for ECSE. The enhancements to the U1a Complex included in this line item will provide the drifts and the supporting structures, systems, and components necessary for the deployment of the MIEs to diagnose the subcritical hydrodynamic integrated weapons experiments using plutonium.

NNSA plans long-term investments supporting plutonium science at the NNSS. NNSS is the only site in the United States for experiments combining high explosives and plutonium, a core capability for NNSA's Stockpile Stewardship Program.
Funds appropriated under this data sheet may be used for contracted support services to the Federal Program Manager and the Federal Project Director to conduct independent assessments of the planning and execution of this project required by DOE O 413.3B and to conduct technical reviews of design and construction documents.

The project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. As allowed by DOE O 413.3B, work will be phased to improve overall efficiency.

OPCs are funded out of the Enhanced Capabilities for Subcritical Experiments subprogram under Stockpile Research, Technology, and Engineering.

Key Performance Parameters (KPPs)
The KPPs represent the minimum acceptable performance that the project must achieve.

Performance Measure	Completion Criteria
17-D-640-010: Ventilation and power sufficient to allow concurrent excavation for two headings east of the U1a.01 Drift	Documented in UCEP Subproject 010 Ventilation Plan; UCEP Electrical Load Calculation; Temporary Power Plan
17-D-640-010: An invert suitable for transport of ASD accelerator equipment between the U1h shaft station and U1a.104 Drift	Documented in Building Code Requirements for Structural Concrete; Invert Plan; Invert Sections; Cast-In-Place Concrete Specification
17-D-640-010: Direct access from the U1a.01 Drift to the U1a.104 Drift for equipment and personnel	Documented in General Arrangement Plan
17-D-640-010: Multiple egress pathways from the U1a.100 Drift and U1a.104 Drift to the U1a.01 Drift	Documented in General Arrangement Plan
17-D-640-010: Operational Refuge Station east of the U1a.01 Drift to accommodate the number of individuals anticipated to normally work in that area	Documented in NNSS Underground Facility Safety and Health Program Description; U1a.102D Drift Refuge Shelter Equipment
17-D-640-020: An invert suitable for installation of the ASD accelerator in the U1a.104 Drift	Documented in the revised Program Requirements Document and the revised Project Execution Plan
17-D-640-020: Utilities and mechanical systems sufficient to support operation and maintenance of the ASD accelerator in the U1a.104 Drift	Documented in the revised Program Requirements Document and the revised Project Execution Plan
17-D-640-020: A zero room structure and mechanical systems that meet requirements for conducting subcritical experiments in the U1a.100 Drift	Documented in the revised Program Requirements Document and the revised Project Execution Plan
17-D-640-020: Infrastructure that supports installation of a centralized control of operation system of the ASD accelerator and NDSE source	Documented in the revised Program Requirements Document and the revised Project Execution Plan
17-D-640-020: Infrastructure that supports acquisition of experiment diagnostic data	Documented in the revised Program Requirements Document and the revised Project Execution Plan

3. Project Cost and Schedule

17-D-640-010: ECSE Access and Life Safety Infrastructure

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2017	2,675	2,675	330
FY 2018	681	681	3,026
Total, Design	**3,356**	**3,356**	**3,356**
Construction			
FY 2017	8,800	8,800	0
FY 2018	14,484	14,484	0
FY 2019	10,000	10,000	8,344
FY 2020	2,000	2,000	16,859
FY 2021	10,090	10,090	13,513
FY 2022	0	0	2,651
FY 2023	0	0	4,007
Total, Construction	**45,374**	**45,374**	**45,374**
Total Estimated Costs			
FY 2017	11,475	11,475	330
FY 2018	15,165	15,165	3,026
FY 2019	10,000	10,000	8,344
FY 2020	2,000	2,000	16,859
FY 2021	10,090	10,090	13,513
FY 2022	0	0	2,651
FY 2023	0	0	4,007
Total, TEC	**48,730**	**48,730**	**48,730**
Other Project Costs (OPC)			
OPC, except D&D			
FY 2015	281	281	281
FY 2016	700	700	700
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	410	410	292
FY 2023	0	0	118
Total OPC, except D&D	**1,391**	**1,391**	**1,391**
OPC D&D			
FY 2015	0	0	0
FY 2016	0	0	0
FY 2017	0	0	0

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
Total, OPC D&D	**0**	**0**	**0**
Total Other Project Costs			
FY 2015	281	281	281
FY 2016	700	700	700
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	410	410	292
FY 2023	0	0	118
Total, OPC	**1,391**	**1,391**	**1,391**
Total Project Costs (TPC)			
FY 2015	281	281	281
FY 2016	700	700	700
FY 2017	11,475	11,475	330
FY 2018	15,165	15,165	3,026
FY 2019	10,000	10,000	8,344
FY 2020	2,000	2,000	16,859
FY 2021	10,090	10,090	13,513
FY 2022	410	410	2,943
FY 2023	0	0	4,125
Grand Total	**50,121**	**50,121**	**50,121**

17-D-640-020: ECSE Laboratory and Support Infrastructure

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Total Estimated Cost (TEC)			
Design			
FY 2017	25	25	25
FY 2018	6,935	6,935	1,045
FY 2019	10,000	10,000	11,056
FY 2020	33,000	33,000	31,477
FY 2021	36,008	36,008	34,890
FY 2022	14,703	14,703	22,178
Total, Design	**100,671**	**100,671**	**100,671**
Construction			
FY 2021	114,502	114,502	11,049
FY 2022	120,297	120,297	41,113
FY 2023	53,130	53,130	200,760
FY 2024	126,570	126,570	134,800
FY 2025	33,083	33,083	47,100
FY 2026	0	0	12,760
Total, Construction	**447,582**	**447,582**	**447,582**
Total Estimated Costs			
FY 2017	25	25	25
FY 2018	6,935	6,935	1,045
FY 2019	10,000	10,000	11,056
FY 2020	33,000	33,000	31,477
FY 2021	150,510	150,510	45,939
FY 2022	135,000	135,000	63,291
FY 2023	53,130	53,130	200,760
FY 2024	126,570	126,570	134,800
FY 2025	33,083	33,083	47,100
FY 2026	0	0	12,760
Total, TEC	**548,753**	**548,753**	**548,753**
Other Project Costs (OPC)			
OPC, except D&D			
FY 2016	2,628	2,628	2,128
FY 2017	1,700	1,700	1,700
FY 2018	1,000	1,000	1,000
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	3,153	3,153	800
FY 2026	0	0	2,653
FY 2027	0	0	200

	Budget Authority (Appropriations)	Obligations	Costs
	($K)		
Total OPC, except D&D	**8,481**	**8,481**	**8,481**
OPC D&D			
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
Total, OPC D&D	**0**	**0**	**0**
Total Other Project Costs			
FY 2016	2,628	2,628	2,128
FY 2017	1,700	1,700	1,700
FY 2018	1,000	1,000	1,000
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	3,153	3,153	800
FY 2026	0	0	2,653
FY 2027	0	0	200
Total, OPC	**8,481**	**8,481**	**8,481**
Total Project Costs (TPC)			
FY 2016	2,628	2,628	2,128
FY 2017	1,725	1,725	1,725
FY 2018	7,935	7,935	2,045
FY 2019	10,000	10,000	11,056
FY 2020	33,000	33,000	31,477
FY 2021	150,510	150,510	45,939
FY 2022	135,000	135,000	63,291
FY 2023	53,130	53,130	200,760
FY 2024	126,570	126,570	134,800
FY 2025	36,236	36,236	47,900
FY 2026	0	0	15,413
FY 2027	0	0	200
Grand Total	**556,734**	**556,734**	**556,734**

17-D-640: Total Project

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Total Estimated Cost (TEC)			
Design			
FY 2017	2,700	2,700	355
FY 2018	7,616	7,616	4,071
FY 2019	10,000	10,000	11,056
FY 2020	33,000	33,000	31,477
FY 2021	36,008	36,008	34,890
FY 2022	14,703	14,703	22,178
Total, Design	**104,027**	**104,027**	**104,027**
Construction			
FY 2017	8,800	8,800	0
FY 2018	14,484	14,484	0
FY 2019	10,000	10,000	8,344
FY 2020	2,000	2,000	16,859
FY 2021	124,592	124,592	24,562
FY 2022	120,297	120,297	43,764
FY 2023	53,130	53,130	204,767
FY 2024	126,570	126,570	134,800
FY 2025	33,083	33,083	47,100
FY 2026	0	0	12,760
Total, Construction	**492,956**	**492,956**	**492,956**
Total Estimated Costs			
FY 2017	11,500	11,500	355
FY 2018	22,100	22,100	4,071
FY 2019	20,000	20,000	19,400
FY 2020	35,000	35,000	48,336
FY 2021	160,600	160,600	59,452
FY 2022	135,000	135,000	65,942
FY 2023	53,130	53,130	204,767
FY 2024	126,570	126,570	134,800
FY 2025	33,083	33,083	47,100
FY 2026	0	0	12,760
Total, TEC	**596,983**	**596,983**	**596,983**
Other Project Costs (OPC)			
OPC, except D&D			
FY 2015	281	281	281
FY 2016	3,328	3,328	2,828
FY 2017	1,700	1,700	1,700
FY 2018	1,000	1,000	1,000
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	410	410	292
FY 2023	0	0	118
FY 2024	0	0	0

	Budget Authority (Appropriations) ($K)	Obligations ($K)	Costs ($K)
FY 2025	3,153	3,153	0
FY 2026	0	0	2,653
FY 2027	0	0	500
Total OPC, except D&D	**9,872**	**9,872**	**9,872**
OPC D&D			
FY 2015	0	0	0
FY 2016	0	0	0
FY 2017	0	0	0
FY 2018	0	0	0
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	0	0	0
Total, OPC D&D	**0**	**0**	**0**
Total Other Project Costs			
FY 2015	281	281	281
FY 2016	3,328	3,328	2,828
FY 2017	1,700	1,700	1,700
FY 2018	1,000	1,000	1,000
FY 2019	0	0	0
FY 2020	0	0	0
FY 2021	0	0	0
FY 2022	410	410	292
FY 2023	0	0	118
FY 2024	0	0	0
FY 2025	3,153	3,153	0
FY 2026	0	0	2,653
FY 2027	0	0	500
Total, OPC	**9,872**	**9,872**	**9,872**
Total Project Costs (TPC)			
FY 2015	281	281	281
FY 2016	3,328	3,328	2,828
FY 2017	13,200	13,200	2,055
FY 2018	23,100	23,100	5,071
FY 2019	20,000	20,000	19,400
FY 2020	35,000	35,000	48,336
FY 2021	160,600	160,600	59,452
FY 2022	135,410	135,410	66,234
FY 2023	53,130	53,130	204,885
FY 2024	126,570	126,570	134,800

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
FY 2025	36,236	36,236	47,900
FY 2026	0	0	15,413
FY 2027	0	0	200
Grand Total	**606,855**	**606,855**	**606,855**[a]

4. Details of Project Cost Estimate

17-D-640-010: ECSE Access and Life Safety Infrastructure

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	2,852	2,852	2,852
Project Management	504	504	504
Contingency	0	0	0
Total, Design	**3,356**	**3,356**	**3,356**
Construction			
Site Work	0	0	0
Equipment	0	0	0
Construction	34,234	34,234	31,606
Construction Management	5,368	5,368	5,368
Contingency	5,772	5,772	7,810
Total, Construction	**45,374**	**45,374**	**44,784**
Total Estimated Cost	**48,730**	**48,730**	**48,140**
Contingency, TEC	*5,772*	*5,772*	*7,810*

[a] A review of actual costs identified inaccuracies in the data provided on previous data sheets. Corrections were made to actual costs for both Subprojects and the total project.

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Other Project Cost (OPC)			
OPC except D&D			
R&D	0	0	0
Conceptual Planning	200	200	200
Conceptual Design	281	281	281
Other OPC Costs	910	910	1,500
Contingency	0	0	0
Total, OPC	1,391	1,391	1,981
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**50,121**	**50,121**	**50,121**
Total Contingency (TEC+OPC)	**5,772**	**5,772**	**7,810**

17-D-640-020: ECSE Laboratory and Support Infrastructure

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	65,519	68,355	65,519
Project Management	35,152	35,152	35,152
Contingency	0	0	0
Total, Design	**100,671**	**103,507**	**100,671**
Construction			
Site Work	0	0	0
Equipment	0	0	0
Construction	338,999	316,863	338,999
Construction Management	62,583	62,600	62,583
Contingency	49,300	35,500	49,300
Total, Construction	**450,882**	**414,963**	**450,882**
Total Estimated Cost	**551,553**	**518,470**	551,553
Contingency, TEC	*49,300*	*35,500*	*49,300*

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Other Project Cost (OPC)			
OPC except D&D			
R&D	0	0	N/A
Conceptual Planning	300	300	300
Conceptual Design	728	728	728
Other OPC Costs	7,453	7,253	7,453
Contingency	0	0	0
Total, OPC	8,481	8,281	8,481
Contingency, OPC	*0*	*0*	0
Total Project Cost	**560,034**	**526,751**	**560,034**
Total Contingency (TEC+OPC)	**49,300**	**35,500**	**49,300**

17-D-640: Total Project

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	68,371	71,207	68,371
Project Management	35,656	35,656	35,656
Contingency	0	0	0
Total, Design	**104,027**	**106,863**	**104,027**
Construction			
Site Work	0	0	0
Equipment	0	0	0
Construction	373,233	351,097	373,233
Construction Management	67,951	67,968	67,951
Contingency	55,072	41,272	55,072
Total, Construction	**496,256**	**460,337**	**496,256**
Total Estimated Cost	**600,283**	**567,200**	600,283
Contingency, TEC	*55,072*	*41,272*	*55,072*
Other Project Cost (OPC)			
OPC except D&D			
R&D	0	0	0
Conceptual Planning	500	500	500
Conceptual Design	1,009	1,009	1,009
Other OPC Costs	8,363	8,163	8,363
Contingency	0	0	0

	($K)		
	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total, OPC	9,872	9,672	9,872
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**610,155**	**576,872**	**610,155**
Total Contingency (TEC+OPC)	***55,072***	***41,272***	***55,072***

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Total
FY 2017	TEC	131,600	19,900	0	0	0	0	0	0	151,500
	OPC	7,109	0	0	0	0	0	0	0	7,109
	TPC	138,709	19,900	0	0	0	0	0	0	158,609
FY 2018	TEC	131,600	19,900	0	0	0	0	0	0	151,500
	OPC	7,109	0	0	0	0	0	0	0	7,109
	TPC	138,700	19,900	0	0	0	0	0	0	158,609
FY 2019	TEC	121,600	29,900	0	0	0	0	0	0	151,500
	OPC	7,109	0	0	0	0	0	0	0	7,109
	TPC	128,700	29,900	0	0	0	0	0	0	158,609
FY 2020	TEC	88,600	48,800	25,600	0	0	0	0	0	163,000
	OPC	6,309	0	1,000	0	4,500	0	0	0	11,809
	TPC	94,909	48,800	26,600	0	4,500	0	0	0	174,809
FY 2021	TEC	88,600	160,600	135,000	123,000	0	0	0	0	507,200
	OPC	6,309	0	0	3,000	10,000	0	0	0	19,309
	TPC	94,909	160,600	135,000	126,000	10,000	0	0	0	526,509
FY 2022	TEC	88,600	160,600	135,000	123,000	0	0	0	0	507,200
	OPC	6,309	417	0	2,583	10,000	0	0	0	19,309
	TPC	94,909	161,017	135,000	125,583	10,000	0	0	0	526,509
FY 2023	TEC	88,600	160,600	135,000	53,130	129,870	0	0	0	567,200
	OPC	6,309	0	410	0	0	2,953	0	0	9,672
	TPC	94,909	160,600	135,410	53,130	129,870	2,953	0	0	576,872
FY 2024	TEC	89,100	160,600	135,000	53,130	126,570	33,083	0	0	597,483
	OPC	6,309	0	410	0	0	3,153	0	0	9,872
	TPC	94,909	160,600	135,410	53,130	126,570	36,236	0	0	606,855[a]

[a] The current baselined TPC of the UCEP project is $610,172,000. Funding in future budget requests will be evaluated to account for the actual costs to complete subproject 010 and to align funding to executability in subproject 020.

6. **Related Operations and Maintenance Funding Requirements**

Start of Operation or Beneficial Occupancy	1Q FY2027
Expected Useful Life	30
Expected Future Start of D&D of this capital asset	1Q FY 2057

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	36	36	1,080	1,080

7. **D&D Information**

The new area being constructed in this project is not replacing existing facilities.

8. **Acquisition Approach**

The project is being managed by the NNSS Management and Operating (M&O) contractor because of operations within the U1a Complex, which is an underground facility with limited access. Design and construction of the underground modifications is being performed by the NNSS M&O contractor through CLIN 001 on the M&O cost-plus contract.

Advanced Sources and Detectors (ASD) Major Item of Equipment (MIE)
LANL Lead (SNL, LLNL, NNSS, NRL support)
Project Data Sheet

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the ASD MIE is $279,601,000. The FY 2024 Request will complete installation of the Injector and Solid State Pulsed Power units at the Integrated Test Stand and initiate testing; continue fabrication of Accelerator cells and modules; continue fabrication of the remaining Solid State Pulsed Power units; and continue with installation at the U1a Facility. The cost of this project has increased due to technology changes, COVID delays/supply chain challenges, and additional risks. The latest critical decision approved was CD-2/3 with a Total Project Cost (TPC) of $1,800,000,000 and a CD-4 date of May 2030.

A Federal Project Director has been assigned to this project.

Significant Changes:

An Independent Cost Estimate (ICE) was completed for Advanced Sources and Detectors (ASD) in September 2022 to support CD-2/3 with a reconciled TPC of $1.8 billion. The ICE also identified a CD-4 date of May 2030.

- During project design, challenges resulted in multiple design modifications under appropriate change control.
- The growth in the project's estimated costs have been driven by the following:
  - Technology changes-incorporation of more advanced technology, to include full solid state pulsed power, to provide expanded capabilities and flexibility to meet the data needs for the Subcritical Experiment program in support of multiple weapon systems.
  - Covid-19/supply chain availability-delays and inefficiencies due to COVID shutdown and extended delivery periods/increased costs of materials.
  - Contractor estimates- significantly underestimated scope

In accordance with DOE Order 413.3B because the project cost grew to more than 50% of the top end of the approved CD-1 range, the Chief Executive for Project Management reaffirmed the alternative selected and a new cost range of $500,000,000 - $1,800,000,000 on November 30, 2022.

CD-2/3 was approved on November 30, 2022.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2020	9/25/2014	6/7/2018	2/6/2019	2Q FY 2022	4Q FY 2021	2Q FY 2022	4Q FY 2025
FY 2021	9/25/2014	6/7/2018	2/6/2019	2Q FY 2022	4Q FY 2021	2Q FY 2022	4Q FY 2025
FY 2022	9/25/2014	6/7/2018	2/6/2019	2Q FY 2022	4Q FY 2021	2Q FY 2022	4Q FY 2025
FY 2023	9/25/2014	6/7/2018	2/6/2019	4Q FY 2022	3Q FY 2022	4Q FY 2022	3Q FY 2027
FY 2024	9/25/2014	6/7/2018	2/6/2019	11/30/2022	8/9/2022	11/30/2022	3Q FY 2030

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-3A – Approve Long Lead Procurements – Scintillator components
CD-3B – Approve Long Lead Procurements – Injector and Pulsed power components
CD-2 – Approve Performance Baseline

Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Fabrication
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Quarter or Date

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3B
FY 2020	4Q FY 2021	3Q FY 2021	
FY 2021	4Q FY 2021	3Q FY 2021	
FY 2022	4Q FY 2021	3Q FY 2021	1Q FY 2022
FY 2023	11/25/2022	4/13/2021	1/3/2022

($K)

Fiscal Year	Total Cost
FY 2020	791,600
FY 2021	1,061,355
FY 2022	939,655
FY 2023	1,284,161
FY 2024	1,800,000

2. Project Scope and Justification

Scope

Enhanced Capabilities for Subcritical Experiments (ECSE) portfolio aims to construct a new underground laboratory in Nevada and to install large modern diagnostic systems necessary to evaluate plutonium implosion system experiments in support of the current and future stockpile. The ASD MIE is one of these diagnostic systems that involves installation of a linear induction accelerator into the U1a Complex. The ASD MIE will provide the capability to conduct weapons-scale, radiographically diagnosed subcritical experiments using special nuclear material (SNM). The radiographic data is required to refine the modern predictive physics models used to certify the present and future stockpile. Radiography (x-ray imaging of dense objects) is the principal tool for diagnosing dynamic weapons-scale experiments and is the key diagnostic for the National Hydrodynamic Test Program at both Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL). Currently, NNSA relies on hydrodynamic tests at the Dual Axis Radiographic Hydrodynamic Test Facility (DARHT) at LANL and at LLNL's Contained Firing Facility using the Flash X-Ray machine. In these tests, surrogate materials replace SNM in the experimental assembly. The surrogate tests explore many significant aspects of primary implosion physics, but cannot explore the unique behavior of plutonium. The ASD MIE Project, funded within the ECSE subprogram, addresses this need and complements other diagnostics already supporting the subcritical, scaled experiments program.

The ASD Project is composed of an MIE (called Scorpius) for four-pulse, single-axis radiographic capability at weapons-relevant scales to be integrated with the U1a Complex Enhancements Project line Item-funded infrastructure improvements, which will house the MIE. The ASD Project is responsible for the technology maturation, design, fabrication and installation, and commissioning of Scorpius through CD-4. The CD-3A long-lead procurement scope is for the procurement of the scintillator and imager with a total cost of $30.8 million and a scheduled completion of 3Q FY 2025. The CD-3B long-lead procurement scope is for components/materials to support the fabrication of the Injector and setup of the Integrated Test Stand with a total cost of $141.6 million and a scheduled completion of 4Q FY 2024.

Justification

The aggregate influences of aging, modern manufacturing techniques, modern materials, and evolving design philosophies are driving the stockpile toward the limits of the nuclear explosive testing database. In 2014, LANL and LLNL jointly identified a capability gap that challenges the ability to certify the stockpile in light of these changes, which involves the evaluation of plutonium response. In 2016, the JASON Defense Advisory Group identified the same gap in capability of the

United States to carry out and diagnose such experiments. The ASD MIE, as part of ECSE, is designed to narrow this gap. Radiographic data from ECSE will help the validation of the W80-4 design and certification of the W87-1 Modification Program. ECSE delivery in the mid-2020s supports these efforts. Funds appropriated under this data sheet may be used for contracted support services to the Federal Program Manager and the Federal Project Director to conduct independent assessments of the planning and execution of this project required by DOE O 413.3B and to conduct technical reviews of design and construction documents.

Key Performance Parameters (KPPs)
The KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the KPPs will be a prerequisite for approval of CD-4, Project Completion In summary, the MIE must be able to generate the x-ray energies and multi-pulse capability necessary to diagnose late-time dynamics in plutonium implosion experiments.

The KPPs established for CD-4 approval are:

- Four radiographic pulses
- Ability to vary the time between pulses (as measured center to center) in a $\geq$1500 ns window, at a pulse spacing $\leq$500 ns for 2 pulses
- Radiographic pulse lengths: between 20 and 80 ns with the ability to control the length (dose) of each pulse to within 5 ns
- Radiographic figure of merit: $\geq$1.2 line pairs per mm visible for 2 pulses with an overburden representing a nominal Object A density
- Radiographic figure of merit: $\geq$0.8 line pairs per mm visible for 2 pulses with an overburden representing a nominal Object C density

3. Financial Schedule

($K)

	Budget	Obligations	Costs
Funding			
FY 2015	10,500	10,500	3,130
FY 2016	10,500	10,500	6,463
FY 2017	7,500	7,500	14,207
FY 2018	34,395	34,395	32,531
FY 2019	50,000	50,000	51,746
FY 2020	112,160	112,160	82,700
FY 2021	166,752	166,752	147,887
FY 2022	174,685	174,685	153,216
FY 2023	247,065	247,065	314,988
FY 2024	279,601	279,601	280,771
FY 2025	348,528	348,528	350,192
FY 2026	215,718	215,718	190,502
FY 2027	87,132	87,132	105,667
FY 2028	55,464	55,464	24,000
FY 2029	0	0	24,000
FY 2030	0	0	18,000
Grand Total	**1,800,000**	**1,800,000**	**1,800,000**

4. Details of Project Cost Estimate

Work Breakdown Structure Estimated Cost ($K)

WBS #	WBS Title	Current Estimate	Previous Estimate
1.01	Project Management	225,000	109,000
1.02	Radiographic System	1,140,100	787,000
1.03	System Engineering and Requirements	19,000	20,300
1.04	ITS Facility Installation, Major Subsystem Installation, Integration, & Testing	42,000	58,300
1.05	U1a Final Major Subsystem Installation, Integration, & Testing	61,000	59,600
1.06	Final Commissioning at U1a	12,900	24,800
	Management Reserve/Contingency	300,000	225,161
	Total	**1,800,000**	**1,284,161**

5. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	3Q FY 2030
Expected Useful Life	30 years
Expected Future Start of D&D of this capital asset	3Q FY 2060

6. Acquisition Approach

The four Management and Operations contractors at the Laboratories and sites (LANL, LLNL, SNL, and NNSS) have formed a multi-site team to execute the Project. This management team structure encourages the full engagement of LANL, LLNL, SNL and NNSS, enabling the NNSA to leverage unique capabilities of each laboratory. It also unifies the design to construction process, which is especially important, as the U1a Complex is an underground facility with limited access.

24-D-513, Z-Pinch Experimental Underground System (ZEUS) Test Bed (ZTBFI) Facilities Improvement
Nevada National Security Site (NNSS), Mercury, Nevada
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary
The Fiscal Year (FY) 2024 Request for Z-Pinch Experimental Underground System (ZEUS) Test Bed Facilities Improvement (ZTBFI) is $80,000,000 of Total Project Cost (TPC) funding. This Request fully funds the current estimate for remaining project activities. This project is part of the Enhanced Capabilities for Subcritical Experiments (ECSE) portfolio and is incorporated into the Mission Need Statement, Analysis of Alternatives, and Program Requirements Document. Critical Decision (CD)-0, *Approve Mission Need*, for the ECSE portfolio, was approved on September 25, 2014.

This project was initiated in FY 2021 as a minor construction project with an estimated TPC of $16,000,000. Due to changes in scope that have impacted the cost estimate, NNSA is requesting the conversion of the project from a minor construction project to a line-item construction project. This is not a new start. Conceptual design was completed in FY 2021, and preliminary design was initiated in FY 2022. The project team is working to document that the project has met CD-1 requirements, which will be submitted to the Project Management Executive (PME) for approval in FY 2023. The project team is developing a transition strategy to implement conversion of the minor construction project to a line-item project culminating in a formal CD-2/3 approval.

The cost range is $49,500,000 to $125,461,000. Costs are based on a Class 5 estimate performed by the Nevada National Security Site (NNSS) Management and Operating Contractor - Mission Support and Test Services, LLC. Efforts are underway to develop a detailed estimate that will be submitted for CD-2/3 approval.

A Federal Project Director at the appropriate level has been identified for this project and will be appointed by the PME as required by DOE Order 413.3B.

Significant Changes:
This project is not a new start for the FY 2024 budget year, but the Construction Project Data Sheet newly requests that the project be converted from a minor construction project to a line-item construction project. In 2019, NNSA planned to construct the test bed within existing U1a Complex infrastructure, primarily within the 03 Testbed. Conceptual design was completed in FY 2021, and preliminary design was initiated in FY 2022. Between August 2021 and March 2022, a variety of factors complicated the design, including additional mining necessary to enable the ZEUS Testbed to fit in the existing 03 Testbed. After a cost benefit analysis, the original plan was superseded by an option to mine new drifts, which caused the cost estimate to exceed the minor construction threshold. The project has entered a transition period, between March 2023 and CD 2/3 approval, where the project team will develop a tailoring approach and implement the requirements of DOE O 413.3B based on the complexities of the project and current status. The project team will ensure that the appropriate requirements are implemented and validated in accordance with the CD-2/3 approval process.

Critical Milestone History

24-D-513: Total Project

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2024	9/25/2014	9/13/2021	3Q FY 2023	3Q FY 2024	4Q FY 2023	3Q FY 2024	N/A	2Q FY 2026

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline

Final Design Complete – Estimated/Actual date the project design will be/was complete
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Project Cost History ($K)[a]

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2024	4,692	118,254	122,946	2,515	N/A	2,515	125,461

2. Project Scope and Justification

Scope
ZEUS Test Bed Facility Improvements includes the design, construction, and commissioning of the ZEUS Test Bed and systems to support dense plasma focus diagnostics. This area will be used for Neutron Diagnosed Subcritical Experiments (NDSE). Also included are safety basis and implementation activities. The project underground scope includes an experimental room with a containment plug, process control system, safety interlock system, diagnostic infrastructure, and ancillary systems (overhead handling systems, power, cooling, ventilation, and shielding).

Justification
The enhancements to the U1a Complex included in this line item will provide the drifts and the supporting structures, systems, and components necessary for NDSE measurements to diagnose the subcritical hydrodynamic integrated weapons experiments using plutonium.

NNSA plans long-term investments supporting plutonium science at the NNSS. NNSS is the only site in the United States for experiments combining high explosives and plutonium, a core capability for NNSA's Stockpile Stewardship Program.
Funds appropriated under this data sheet may be used for contracted support services to the Federal Program Manager and the Federal Project Director to conduct independent assessments of the planning and execution of this project and to conduct technical reviews of design and construction documents.

The ECSE program requirements include x-radiography capability (provided via the ASD/UCEP projects) and Neutron Diagnosed Subcritical Experiment (NDSE) measurement capabilities, which will be provided through the dense plasma focus system installed in the ZEUS Testbed.

The project will be conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. As allowed by DOE O 413.3B, a tailoring strategy will be employed.

[a] Because the project was notified and began execution as a Minor Construction project, TEC Design and a portion of TEC Construction is funded through program funding. Pursuant to 50 U.S.C. 2743(c), NNSA will not obligate more than $30 million of TEC funding until formal submission of a report to the congressional defense committees is made, explaining the reasons for the cost variation above the Minor Construction threshold.

Key Performance Parameters (KPPs)

The KPPs represent the minimum acceptable performance that the project must achieve.

Performance Measures	Completion Criteria
Construct an extension to the U1a.03E drift and a new U1a.03H drift capable of executing Neutron Diagnosed Subcritical Experiments	Will be documented in the Program Requirements Document and the Project Execution Plan
An invert suitable for installation of the NDSE Z-Pinch Pulsed Neutron diagnostic and detector system in the U1a.03E and U1a.03H drifts	Will be documented in the Program Requirements Document and the Project Execution Plan
Utilities and mechanical systems sufficient to support operation and maintenance of the NDSE Z-Pinch Pulsed Neutron diagnostic and detector system in the U1a.03E and U1a.03H drifts.	Will be documented in the Program Requirements Document and the Project Execution Plan
A zero-room structure and mechanical systems that meet requirements for conducting subcritical experiments in the U1a.03E drift.	Will be documented in the Program Requirements Document and the Project Execution Plan
Infrastructure that supports acquisition of experiment diagnostic data	Will be documented in the Program Requirements Document and the Project Execution Plan

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2021	4,692	4,692	0
FY 2022	0	0	2,792
FY 2023	0	0	1,900
Total, Design	**4,692**	**4,692**	**4,692**
Construction			
FY 2021	14,062	14,062	0
FY 2022	12,736	12,736	7,156
FY 2023	12,956	12,956	20,673
FY 2024	78,500	78,500	33,500
FY 2025	0	0	44,000
FY 2026	0	0	12,925
Total, Construction	**118,254**	**118,254**	**118,254**
Total Estimated Costs			
FY 2021	18,754	18,754	0
FY 2022	12,736	12,736	9,948
FY 2023[a]	12,956	12,956	22,573
FY 2024	78,500	78,500	33,500
FY 2025	0	0	44,000
FY 2026	0	0	12,925
Total, TEC	**122,946**	**122,946**	**122,946**
Other Project Costs (OPC)			
OPC, except D&D			
FY 2021	1,015	1,015	1,015
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	1,500	1,500	0
FY 2025	0	0	0
FY 2026	0	0	1,500
Total OPC, except D&D	**2,515**	**2,515**	**2,515**
OPC D&D			
FY 2021	0	0	0
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	0	0	0
FY 2025	0	0	0

[a] Pursuant to 50 U.S.C. 2743(c), NNSA will not obligate more than $30 million of TEC funding until formal submission of a report to the congressional defense committees is made, explaining the reasons for the cost variation above the Minor Construction threshold.

($K)

	Budget Authority (Appropriations)	Obligations	Costs
FY 2026	0	0	0
Total, OPC D&D	**0**	**0**	**0**
Total Other Project Costs			
FY 2021	1,015	1,015	1,015
FY 2022	0	0	0
FY 2023	0	0	0
FY 2024	1,500	1,500	0
FY 2025	0	0	0
FY 2026	0	0	1,500
Total, OPC	**2,515**	**2,515**	**2,515**
Total Project Costs (TPC)			
FY 2021	19,769	19,769	1,015
FY 2022	12,736	12,736	9,948
FY 2023[a]	12,956	12,956	22,573
FY 2024[b]	80,000	80,000	33,500
FY 2025	0	0	44,000
FY 2026	0	0	14,425
Grand Total	**125,461**	**125,461**	**125,461**

[a] Pursuant to 50 U.S.C. 2743(c), NNSA will not obligate more than $30 million of TEC funding contained in this TPC funding until formal submission to the congressional defense committees of a report explaining the reasons for the cost variation above the Minor Construction threshold.

[b] While executing this project as a minor construction project, NNSA requested project OPCs and TECs within two Assessment Science subprograms: Enhanced Capabilities for Subcritical Experiments and Hydrodynamic and Subcritical Experiment Execution Support. Beginning in FY 2024, NNSA requests line-item funding.

4. Details of Project Cost Estimate

($K)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	3,989	N/A	N/A
Project Management	703	N/A	N/A
Contingency	0	N/A	N/A
Total, Design	**4,692**	**N/A**	**N/A**
Construction			
Site Work	0	N/A	N/A
Equipment	0	N/A	N/A
Construction	75,495	N/A	N/A
Construction Management	13,323	N/A	N/A
Contingency	29,436	N/A	N/A
Total, Construction	**118,254**	**N/A**	**N/A**
Total Estimated Cost	**122,946**	**N/A**	**N/A**
Contingency, TEC	*29,436*	*N/A*	*N/A*
Other Project Cost (OPC)			
OPC except D&D			
R&D	0	N/A	N/A
Conceptual Planning	90	N/A	N/A
Conceptual Design	925	N/A	N/A
Other OPC Costs	1,500	N/A	N/A
Contingency	0	N/A	N/A
Total, OPC	2,515	N/A	N/A
Contingency, OPC	*0*	*N/A*	*N/A*
Total Project Cost	**125,461**	**N/A**	**N/A**
Total Contingency (TEC+OPC)	**29,436**	**N/A**	**N/A**

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2024	FY 2025	Total
FY 2024	TEC	44,446	78,500	0	122,946
	OPC	1,015	1,500	0	2,515
	TPC	45,461	80,000	0	125,461

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	2Q FY 2026
Expected Useful Life	30
Expected Future Start of D&D of this capital asset	2Q FY 2056

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	N/A	6.3	N/A	189

7. D&D Information

The new area being constructed in this project is not replacing existing facilities.

8. Acquisition Approach

The project is being managed by the NNSS Management and Operating (M&O) contractor because of operations within the U1a Complex, which is an underground facility with limited access. Design and construction of the underground modifications will be performed by the NNSS M&O contractor through CLIN 001 on the M&O cost-plus contract.

Academic Programs and Community Support

Overview

Starting in FY 2024, the National Nuclear Security Administration (NNSA) is proposing to elevate Academic Programs from a congressional control level within Stockpile, Research, Technology, and Engineering (SRT&E) to a stand-alone Government Results and Performance Act (GPRA) Unit/control level titled, Academic Programs and Community Support. This budget structure change will enable improved program integration, agility, development, and alignment to critical workforce needs. It also is consistent with the goal of advancing equity and support for underserved communities through the Federal Government.

Within NNSA, the challenges of modernizing our nuclear stockpile demand a strong and diverse base of national expertise and educational opportunities in specialized technical areas that uniquely contribute to nuclear stockpile stewardship. Academic Programs and Community Support is designed to invest in science and engineering disciplines of critical importance to NNSA's nuclear security enterprise. This includes such disciplines as nuclear science, radiochemistry, materials at extreme conditions, high energy density science, advanced manufacturing, and high-performance computing. The program's grants, centers, fellowships, and other funding options offer an introduction to the mission and people in the national laboratories, establishing a workforce pipeline to strengthen the future enterprise.

Academic Programs and Community Support has seven strategic objectives:
1. Strengthen key fields of research relevant to the nuclear security mission through scientific advancement
2. Drive scientific and technical innovation within the academic community that can be leveraged by NNSA laboratories
3. Develop the next generation of diverse, highly trained, technical workers able to support DOE/NNSA's core missions
4. Ensure a diverse and robust cadre of experts trained in disciplines vital to the nuclear security enterprise (NSE) who are eligible to work at the highest levels of nuclear security
5. Maintain technical expertise external to the NSE that can be leveraged to provide advice, cross-check, and peer review
6. Expand the pool of workforce talent in the NSE by taking a more comprehensive and integrated approach to academic pipeline development
7. Provide benefits to disadvantaged communities, including Tribal Nations and rural communities, that are affected by activities at NNSA sites.

Academic Programs and Community Support enables robust and diverse science, technology, engineering, and mathematics (STEM) research for educational communities through a variety of methods. Investments in consortia and centers of excellence provide collaborative groups to tackle large questions through multi-disciplinary approaches, and they leverage preeminent scientists in relevant fields. Research grants and focused investigatory centers support individual principal investigators to foster a vibrant community that is responsive to new breakthroughs by providing flexibility for new ideas, diversity, and career growth. Specific support to minority and Tribal-serving institutions prepares a diverse workforce of world-class talent through strategic partnerships. Fellowships provide graduate students with key opportunities to connect with the NNSA missions and provide direct experiences at NSE sites. User facilities open opportunities for academic partners to use NNSA's cutting-edge research facilities and push frontiers of current scientific understanding. All Academic Programs and Community Support opportunities focus on quality science through competitive award, connection with NNSA mission work at national security laboratories and nuclear weapons production facilities, and a view to the NSE's future needs and opportunities.

Primary responsibilities of this program include:
- Managing academic solicitations and competitive awards.
- Providing premier technical expertise aligned with the NSE's current and future needs.
- Enabling connections between academic research communities and the NSE, as well as between communities surrounding NSE sites and the NSE to foster understanding of the NNSA mission.
- Attracting and training a future workforce through on-site opportunities and personal connections with laboratory scientists and engineers.

The consolidation of activities under Academic Programs and Community Support allows NNSA to better coordinate across subprograms, leverage strengths, and integrate resources to address the needs of NNSA when engaging with academic partners. The inclusion of cross-cutting, pipeline-focused subprograms allows NNSA to increase its exposure within the science and technology community and reduce barriers to entry for new students, faculty, departments, and academic institutions interested in NNSA-sponsored research and development opportunities. These strategies, employed together, allow NNSA to realize the full potential of the staple subprograms already in place and evolve to meet the future needs of the NSE.

Academic Programs and Community Support is made up of eight subprograms:
1. Stewardship Science Academic Alliance (SSAA)
2. Minority Serving Institution Partnership Program (MSIPP)
3. Tribal Education Partnership Program (TEPP)
4. Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP)
5. Computational Science Graduate Fellowship (CSGF)
6. Predictive Science Academic Alliance Program (PSAAP)
7. Pipeline Development (PD)
8. Community Capacity Building Program (CCBP)

Academic Programs and Community Support
Funding (Comparable)

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Academic Programs and Community Support					
Stewardship Science Academic Alliance (SSAA)	*27,567*	*24,987*	*26,029*	*+1,042*	*+4.2%*
Minority Serving Institution Partnership Program (MSIPP)	*40,000*	*45,000*	*45,000*	*0*	*0%*
Tribal Education Partnership Program (TEPP)	*10,000*	*10,000*	*10,000*	*0*	*0%*
Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP)	*11,883*	*8,883*	*10,412*	*+1,529*	*+17.2%*
Computational Science Graduate Fellowship (CSGF)	*2,000*	*2,000*	*2,000*	*0*	*0%*
Predictive Science Academic Alliance Program (PSAAP)	*20,462*	*21,042*	*21,830*	*+788*	*+3.7%*
Pipeline Development	*0*	*0*	*7,000*	*+7,000*	*0%*
Community Capacity Building Program	*0*	*0*	*30,000*	*+30,000*	*0%*
Total, Academic Programs and Community Support	**111,912**	**111,912**	**152,271**	**+40,359**	**+36.1%**

Academic Programs and Community Support
Outyear Funding (Comparable)

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Academic Programs and Community Support				
Stewardship Science Academic Alliance (SSAA)	*31,933*	*38,461*	*40,244*	*42,560*
Minority Serving Institution Partnership Program (MSIPP)	*45,000*	*45,000*	*45,000*	*45,000*
Tribal Education Partnership Program (TEPP)	*10,000*	*10,000*	*10,000*	*10,000*
Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP)	*13,357*	*16,322*	*17,355*	*18,928*
Computational Science Graduate Fellowship (CSGF)	*4,715*	*7,542*	*7,363*	*8,407*
Predictive Science Academic Alliance Program (PSAAP)	*23,822*	*29,524*	*30,944*	*33,031*
Pipeline Development	*13,937*	*17,011*	*13,957*	*14,500*
Community Capacity Building Program	*30,000*	*30,000*	*30,000*	*30,000*
Total, Academic Programs and Community Support	**172,764**	**193,860**	**194,863**	**202,426**

Academic Programs and Community Support
Funding (Non-Comparable)

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Stockpile Research, Technology, and Engineering					
Academic Programs	**111,912**	**111,912**	**0**	**-111,912**	**0%**
Academic Programs and Community Support	**0**	**0**	**152,271**	**+152,271**	**0%**
Pipeline Development	0	0	7,000	+7,000	**+100%**
Community Capacity Building Program	0	0	30,000	+30,000	**+100%**
Academic Programs	**111,912**	**111,912**	**152,271**	**+40,359**	**+36.1%**

Academic Programs and Community Support
Outyear Funding (Non-Comparable)

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Academic Programs and Community Support				
Stewardship Science Academic Alliance (SSAA)	*31,933*	*38,461*	*40,244*	*42,560*
Minority Serving Institution Partnership Program (MSIPP)	*45,000*	*45,000*	*45,000*	*45,000*
Tribal Education Partnership Program (TEPP)	*10,000*	*10,000*	*10,000*	*10,000*
Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP)	*13,357*	*16,322*	*17,355*	*18,928*
Computational Science Graduate Fellowship (CSGF)	*4,715*	*7,542*	*7,363*	*8,407*
Predictive Science Academic Alliance Program (PSAAP)	*23,822*	*29,524*	*30,944*	*33,031*
Pipeline Development	*13,937*	*17,011*	*13,957*	*14,500*
Community Capacity Building Program	*30,000*	*30,000*	*30,000*	*30,000*
Total, Academic Programs and Community Support	**172,764**	**193,860**	**194,863**	**202,426**

($K)

Proposed FY 2024 Budget Structure

Academic Programs and Community Support[a]

	(Reporting Levels under Academia, Pipeline, and Workforce)								
	Stewardship Science Academic Alliance (SSAA)	Minority Serving Institution Partnership Program (MSIPP)	Tribal Education Partnership Program (TEPP)	Joint Program in High Energy Density Laboratory Plasmas (HEDLP)	Computational Science Graduate Fellowships (CSGF)	Predictive Science Academic Alliance Program (PSAPP)	Pipeline Development (PD)	Community Capacity Building Program	Total
FY 2023 Budget Structure[a]									
Weapons Activities									
Stockpile Research, Technology, and Engineering									
Academic Programs	26,029	45,000	10,000	10,412	2,000	21,830	7,000	30,000	152,271
Total	**26,029**	**45,000**	**10,000**	**10,412**	**2,000**	**21,830**	**7,000**	**30,000**	**152,271**

[a] Table reflects FY 2023 budget structure (left) showing Academic Programs under Stockpile Research, Technology and Engineering vs. proposed FY 2024 budget structure (top) for independent GPRA Academic Programs and Community Support.

Academic Programs and Community Support
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Academic Programs and Community Support	
Stewardship Science Academic Alliance: increase supports university research grants and centers of excellence.	**+1,042**
Joint Program in High Density Laboratory Plasmas: increase expands opportunities for national collaboration in high energy density science.	**+1,529**
Predictive Science Academic Alliance program: increase supports academic applied research programs and computing resources to enable centers of excellence to achieve their research objectives.	**+788**
Pipeline Development: increase supports creation of new subprogram to grow the workforce in disciplines vital to the nuclear security enterprise and to expand the pool of talent in science, technology, engineering, and mathematics to be recruited and cleared to work in the nuclear security enterprise.	**+7,000**
Community Capacity Building Program: increase supports creation of new subprogram to bolster job creation, community restoration, infrastructure projects, and educational resources in communities affected by activities at the NNSA sites.	**+30,000**
Total, Academic Programs and Community Support	**+40,359**

Academic Programs and Community Support
Stewardship Science Academic Alliance (SSAA)

Description

The Stewardship Science Academic Alliance (SSAA) subprogram supports scientific academic research programs to develop the next generation of highly-trained, technical workers able to support its core mission and to ensure there is a strong community of technical peers, external to the NNSA national laboratories, capable of providing peer review and scientific competition to strengthen the basic fields of research relevant to NNSA's NSE.

The SSAA subprogram funds both collaborative centers of excellence and smaller individual investigator research projects to conduct fundamental science and technology research of relevance to stockpile stewardship. Current technical areas include studies of materials under extreme conditions, low-energy nuclear science, high energy density physics, and radiochemistry. SSAA funding supports research at approximately 80 universities, including training of over 200 graduate students and post-doctoral researchers. A key element of both centers of excellence and individual investigator awards is the connection of students with the NSE. These opportunities are focused on technical fields critical to stewardship science, building a field of talented researchers and committed doctoral students sharing a common desire to advance science while contributing to national security.

The SSAA subprogram also funds the Stewardship Science Graduate Fellowship (SSGF) and the Laboratory Residency Graduate Fellowship (LRGF) with the goal of addressing workforce needs by providing financial support and professional development opportunities to students pursuing a Ph.D. in fields of study that address complex science and engineering problems critical to stockpile stewardship.

Highlights of the FY 2024 Budget

- Supports funding opportunity announcement for SSAA university research grants to solicit scientific research in areas crucial to the Stockpile Stewardship Program.
- Provides support for ongoing SSAA centers of excellence and to complete on-site, mid-term progress reviews.
- Continues to provide support and hands-on training for graduate students in areas relevant to stockpile stewardship, connecting these students with opportunities at the national laboratories, by placing a new, annual cohort of fellows as part of the SSGF and LRGF graduate fellowship programs.
- Sponsors the annual SSAA symposium, bringing together research teams supported by the SSAA and the JPHEDLP Programs. In addition to highlighting current research and encouraging collaboration, a focus on students includes activities such as poster competitions, student lunch with lab representatives, and "lab hour" highlighting laboratory directions and opportunities for students/graduates.

FY 2025 – FY 2028 Key Milestones

- Supports cohort of individual investigator grants in fields of nuclear science, radiochemistry, and materials at extreme conditions to develop the next generation of highly trained technical staff.
- Supports new Funding Opportunity Announcement for the next cohort of centers of excellence expected to be released in Quarter 2 (Q2) FY 2027, to be awarded on FY 2028 funds (joint with JPHEDLP).
- Supports full cohorts of SSGF and LRGF fellows.

Stewardship Science Academic Alliance
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Stewardship Science Academic Alliance $24,987,000	**Stewardship Science Academic Alliance $26,029,000**	**Stewardship Science Academic Alliance +$1,042,000**
• Program was under Academic Programs within SRT&E. • Support scientific research in areas crucial to the stockpile stewardship program. • Support fourth year of SSAA centers of excellence. • Continue to provide support and hands on training for graduate students in areas relevant to stockpile stewardship, through fellowship programs. • Sponsor highly attended annual SSAA symposium bringing together research teams supported by the SSAA, the JPHEDLP, and the National Laser User Facility (NLUF) programs.	• Supports scientific research in areas crucial to the stockpile stewardship program. • Supports new SSAA centers of excellence. • Continues to provide support and hands on training for graduate students in areas relevant to stockpile stewardship through fellowship programs. • Sponsors highly attended annual SSAA symposium, bringing together research teams supported by the SSAA and JPHEDLP Programs.	• Increase supports university research grants and centers of excellence in areas critical to the stockpile stewardship program.

Academic Programs and Community Support
Minority Serving Institution Partnership Program (MSIPP)
Tribal Education Partnership Program (TEPP)

Description

NNSA's Minority Serving Institution Partnership Program (MSIPP) and Tribal Education Partnership Program (TEPP)'s mission is to create and foster a sustainable STEM-pathway that prepares a diverse workforce of world-class talent through strategic partnerships between Minority Serving Institutions (MSIs) and the NNSA NSE. TEPP builds capacity and increases collaboration with Tribal Colleges and Universities (TCUs). MSIPP and TEPP align investments in university capacity and workforce development with the NNSA mission to develop the needed skills and talent for the NSE's enduring technical workforce, and to enhance research and education capacity at under-represented colleges and universities.

The two programs have the following goals:

1. Strengthen and expand minority- and tribal-serving institutions' educational and/or research capacity in NNSA mission areas of interest.
2. Target collaborations between minority- and tribal-serving institutions and the NSE that increase interactions to provide minority- and tribal-serving institutions' direct access to NSE resources.
3. Increase the number of MSI students who graduate with STEM degrees relevant to NNSA mission areas and who have had exposure to career opportunities within the NSE.
4. Increase the number of minority graduates and post-doctoral students hired into the NSE's technical and scientific workforce.

With the increase of two consortia from FY 2022 to FY 2023, NNSA continues to develop the next-generation workforce through MSIPP and TEPP which together fund 32 consortia consisting of 56 MSIs, including 21 HBCUs, 24 HSIs, and 11 TCUs along with 13 NSE sites.

Highlights of the FY 2024 Budget

- Pursues consortium-based STEM grants that specifically target Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), and TCUs, and provide the opportunity to build STEM capacity and academic infrastructure in alignment with the NSE.
- Increases student engagement and internship opportunities and confirms the hiring of various minority students into the NSE that have matriculated through various STEM consortium pathways.
- Continues existing partnerships with MSIs.
- Supports the MSIPP consortium-based model focused on capacity building, research, student enrichment programs, and internships in STEM.
- Supports building educational/institutional infrastructure and enhancing the pathway of diverse, high-quality talent in STEM academic disciplines and careers.

FY 2025 – FY 2028 Key Milestones

- Develops and maintains a long-term, recruiting pathway to NNSA laboratories, plants, and sites by increasing awareness of MSIPP, TEPP, and sustaining partnerships between MSIs and the NSE.
- Partners with other federal agencies and/or programs to broaden the reach of the MSIPP with a goal of pursuing mission-related STEM projects to further enhance the educational and/or research capacity at MSIs.
- Grows the number of TCUs partners participating in MSIPP to build their capacity and academic infrastructure in STEM and increase awareness of opportunities available within the NSE.

Minority Serving Institution Partnership
Tribal Education Partnership Program
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Minority Serving Institution Partnership Program $45,000,000	**Minority Serving Institution Partnership Program $45,000,000**	**Minority Serving Institution Partnership Program $0**
• Program was under Academic Programs within SRT&E. • Continue existing partnerships with Minority Serving Institutions. • Continue consortium-based STEM grants that specifically target HBCUs, HSIs, and TCUs and provide the opportunity to build STEM capacity and academic infrastructure with alignment to the nuclear security enterprise. • Increase student engagement and internship opportunities and confirm the hiring of various minority students into the nuclear security enterprise that have matriculated through various STEM consortium pipelines.	• Continues existing partnerships with MSIs. • Continues consortium-based STEM grants that specifically target HBCUs, HSIs, and TCUs and provide the opportunity to build STEM capacity and academic infrastructure with alignment to the NSE. • Increases student engagement and internship opportunities and confirms the hiring of various minority students into the NSE that have matriculated through various STEM consortium pipelines.	• No change.
Tribal Education Partnership Program $10,000,000	**Tribal Education Partnership Program $10,000,000**	**Tribal Education Partnership Program $0**
• Program was under Academic Programs within SRT&E. • Maintain partnerships with TCUs. • Maintain educational/institutional infrastructure and enhancing the pipeline of diverse, high-quality talent in STEM academic disciplines and careers.	• Maintains partnerships with TCUs. • Maintains educational/institutional infrastructure and enhancing the pipeline of diverse, high-quality talent in STEM academic disciplines and careers.	• No change.

Academic Programs and Community Support
Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP)

Description

High energy density (HED) states are central to many aspects of nuclear weapons. Maintaining a strong HED academic community in this unique field will be critical for the future needs of a modern nuclear stockpile. The Joint Program in High Energy Density Laboratory Plasmas (JPHEDLP) is designed to steward the study of laboratory HED plasma physics by funding academic research of ionized matter in laboratory experiments for which the stored energy reaches approximately 100 billion joules per cubic meter (i.e., pressures of approximately 1 million atmospheres). The program has three primary elements: individual investigator research grants, research centers of excellence, and facility access.

Individual investigator grants: NNSA's Office of Defense Programs partners with the DOE's Office of Fusion Energy Sciences in the Office of Science to issue an annual joint solicitation for HED Laboratory Plasmas research. The coordination across agencies enables the support of a strong and broad academic presence in HED science, leveraging common interests while assuring NNSA-specific interests in this area remain vibrant. Competitively-awarded research grants are selected through the joint solicitation conducted in coordination with the Office of Science.

Research Centers of Excellence: The JPHEDLP funding also supports the HED centers of excellence selected under the competitive SSAA process. Centers of Excellence are an integrated, multi-institutional, collaborative effort focused on a central problem or theme. These centers work closely with NSE scientists and maintain a core set of academic expertise in key technical areas.

Facility access: Supports broad, scientific facility access to apply NNSA-unique tools to accomplish cutting-edge science. Provides hands-on research experience to academic and industrial researchers using the Omega and Omega EP lasers as tools for conducting basic research experiments. In the pursuit of fundamental science advances, the innovative development of diagnostics and platforms by user facility partners often have proven beneficial to NNSA experimental efforts.

Community development: Specialized educational opportunities both train and attract students in HED science. The JPHEDLP provides funding for HED summer schools and facility workshops.

Highlights of the FY 2024 Budget

- Expands opportunities for national collaboration in high energy density science research through the enhancement of existing grants and cooperative agreements, as well as the establishment of new financial assistance awards.
- Supports academic research Centers of Excellence in HED science.
- Awards academic research grants in HEDLP competitively awarded through annual HEDLP funding opportunity announcement (FOA) held jointly with the DOE Office of Science. Annual selection of NNSA supported awards will enhance flexibility, attract new researchers, and assure career opportunities.
- Supports facility access and community development through facility-time travel support, HED summer schools, and facility user workshops.

FY 2025 – FY 2028 Key Milestones

- Supports cohorts of HEDLP grants to enable a strong and broad academic presence in HED science.
- Continues collaborating with DOE-SC on next annual joint solicitation for HEDLP research.
- Releases new Funding Opportunity Announcement for the next cohort of HED Centers of Excellence in Q2 FY 2027, to be awarded on FY 2028 funds (joint with SSAA).

Joint Program in High Energy Density Laboratory Plasmas
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Joint Program in High Energy Density Laboratory Plasmas $8,883,000	**Joint Program in High Energy Density Laboratory Plasmas $10,412,000**	**Joint Program in High Energy Density Laboratory Plasmas +$1,529,000**
• Program was under Academic Programs within SRT&E. • Expand opportunities for national collaboration in HED science research through the enhancement of existing grants and cooperative agreements as well as the establishment of new financial assistance awards. • Support academic research Centers of Excellence in HED science. • Support academic research grants in HEDLP competitively awarded through annual HEDLP funding opportunity announcement held jointly with the DOE Office of Science. • Offer supplemental grants to increase diversity among participants. • Continue to support facility access and community development through HED summer schools and facility user workshops.	• Expands opportunities for national collaboration in HED science research through the enhancement of existing grants and cooperative agreements as well as the establishment of new financial assistance awards. • Supports academic research Centers of Excellence in HED science. • Supports academic research grants in HEDLP competitively awarded through annual HEDLP funding opportunity announcement held jointly with the DOE Office of Science. • Continues to support facility access and community development through HED summer schools and facility user workshops.	• The increase expands opportunities for national collaboration in HED science research through additional grants, HED facility access, and collaborations with consortia for laser and pulsed power technology.

Academic Programs and Community Support
Computational Science Graduate Fellowship (CSGF)

Description

The goal of the DOE Computational Science Graduate Fellowship (CSGF) program is to cultivate the next generation of scientists and engineers in computational sciences. For NNSA, CSGF supports the Advanced Simulation and Computing (ASC) and Stockpile Modernization missions by establishing academic programs for multidisciplinary simulation science and through graduate fellowships providing students the relevant experience for weapons code development through open science applications. The NNSA CSGF activity is managed by the Krell Institute and jointly funded with the DOE Office of Science's Advanced Scientific Computing Research program.

The DOE CSGF fosters a community of enthusiastic and committed doctoral students, alumni, DOE laboratory staff and various scientists who desire to have an impact on national security and energy missions while advancing their research. It increases collaboration between NNSA national security laboratories, the fellows, and their universities by enhancing the fellows' research experience at the national laboratories via access to unclassified, high-performance computing systems, and exposing them to the broader, multi-disciplinary research activities at the laboratories. The program also provides a yearly stipend, tuition fee coverage, and academic allowance.

Highlights of the FY 2024 Budget

- Collaborates with DOE Office of Science in funding a new cohort of fellows to be trained as next-generation leaders in computational science.
- Fosters a CSGF community of energetic and committed doctoral students, alumni, and DOE/NNSA laboratory staff who together serve as a support system for the new and current fellows.
- Continues NNSA commitment for CSGF to support resources for ensuring a supply of scientists and engineers trained to meet NNSA workforce needs in computational science.

FY 2025 – FY 2028 Key Milestones

- Supports the next cohorts of fellows in the CSGF Program.
- Enhances visibility for computational science careers by supporting the CSGF program to ensure a pipeline of trained scientists and engineers to meet DOE/NNSA workforce needs in computational science.
- Continues to strengthen ties between the national academic community and DOE/NNSA laboratories so the fellowship's multidisciplinary nature builds the national scientific community.

Computational Science Graduate Fellowship
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Computational Science Graduate Fellowship $2,000,000	**Computational Science Graduate Fellowship $2,000,000**	**Computational Science Graduate Fellowship $0**
• Program was under Academic Programs within SRT&E. • Collaborate with DOE Office of Science in funding new cohort of fellows to be trained as next-generation leaders in computational science. • Support CSGF community of energetic and committed doctoral students, alumni, and DOE/NNSA laboratory staff who all together serve as a support system for the new and current fellows. • Continue support for enhancing number of scientists and engineers trained to meet NNSA workforce needs in computational science.	• Collaborates with DOE Office of Science in funding new cohort of fellows to be trained as next-generation leaders in computational science. • Fosters a CSGF community of energetic and committed doctoral students, alumni, and DOE/NNSA laboratory staff who all together serve as a support system for the new and current fellows. • Continues NNSA commitment for CSGF to support resources for ensuring a supply of scientists and engineers trained to meet NNSA workforce needs in computational science.	• No Change.

Academic Programs and Community Support
Predictive Science Academic Alliance Program (PSAAP)

Description

The Predictive Science Academic Alliance Program (PSAAP) engages with leading U.S. universities, focusing on the development and demonstration of technologies and methodologies to solve open science and engineering application problems. The research performed by the universities in this program is discipline-focused to further predictive science and enabled by effective use of high-performance computing. Predictive science is the aim of this program and is based on verification and validation and uncertainty quantification methodologies for large-scale simulations.

PSAAP consists of the following types of centers: Multi-disciplinary Simulation Centers (MSCs), Single-Discipline Centers (SDCs), and Focused Investigatory Centers (FICs). MSCs focus on scalable application simulations, targeting large-scale, integrated multidisciplinary problems; while SDCs focus on scalable application simulation for targeting a broad single science or engineering discipline. FICs are tightly focused on a specific research topic of interest to NNSA's mission in either a science/engineering discipline or an exascale enabling technology.

PSAAP has a long-term goal to cultivate the next generation of scientists and engineers to support the ASC and Stockpile Modernization missions. The funded PSAAP Centers will help their institutions develop new research techniques and strengthen existing efforts, for multidisciplinary, computational science and engineering research, while providing students and research staff relevant code development and high-performance computing (HPC) experience through open science and engineering applications.

Highlights of the FY 2024 Budget

- Continues to support large-scale, multi-disciplinary, predictive science, simulation-based research as a major academic applied research program.
- Manages PSAAP III Academic Alliance Centers for their fifth project year to achieve annual milestone objectives.
- Administers dedicated, appropriate ASC computing resources and user support to enable the PSAAP Centers to achieve their respective simulation demonstration milestones regarding their overarching research objectives.

FY 2025 – FY 2028 Key Milestones

- Continues engagement and support for the PSAAP Centers and their respective cooperative agreements.
- Supports continued development and demonstration of technologies and methodologies to support effective Exascale computing in the context of science/engineering applications.
- Conducts annual and closeout reviews for each of the PSAAP III Centers.
- Reviews subject areas and disciplines relevant to NNSA mission needs prior to start of PSAAP IV portfolio.
- Executes plan for PSAAP IV procurement by preparing the Request for Interest (RFI) and FOA solicitations.
- Selects and supports establishment of PSAAP IV Centers while strengthening engagement with the academic community.

Predictive Science Academic Alliance Program
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Predictive Science Academic Alliance Program $21,042,000	**Predictive Science Academic Alliance Program $21,830,000**	**Predictive Science Academic Alliance Program +$788,000**
• Program was under Academic Programs within SRT&E. • Continue development and demonstration of technologies and methodologies to support effective exascale computing in the context of science and engineering applications. • Support PSAAP III Academic Alliance Centers in their third project year to achieve annual milestone objectives. • Provide appropriate ASC HPC resources and user support for the PSAAP Centers to accomplish the requisite simulation demonstration milestones.	• Continues development and demonstration of technologies and methodologies to support effective exascale computing in the context of science and engineering applications. • Supports PSAAP III Academic Alliance Centers for their fourth project year to achieve annual milestone objectives. • Supplies appropriate ASC HPC resources and user support for the PSAAP Centers to accomplish their simulation demonstration milestones.	• Increase supports PSAAP III Academic Alliance Centers in developing and demonstrating integrated predictive simulations and scientific advances in exascale computing.

Academic Programs and Community Support
Pipeline Development

Description

Pipeline Development supports efforts to grow the workforce in disciplines vital to the NSE by increasing NNSA's presence within the scientific community and expanding the pool of STEM talent who are identified, recruited, cleared, and retained in the NSE.

Highlights of the FY 2024 Budget

- Introduces students to pathways and careers in STEM within the NNSA.
- Supports efforts including outreach, exposure to STEM activities, student and faculty engagement, and NNSA laboratories/plants/sites coordination.
- Forms a Strategy Team consisting of various stakeholders to develop a comprehensive and integrated Pipeline Development Strategy to expand and diversify the pool of workforce talent in the NSE.

FY 2025 – FY 2028 Key Milestones

- Develops an actionable growth strategy that anticipates future needs and trends within the NSE.
- Devises Pipeline Development Metrics that support the ability to:
  - Stay abreast of trends within the NSE.
  - Forecast the STEM workforce needs for production and modernization missions.
  - Identify gaps and stressors within the workforce and recommend corrective action.
- Conducts a cross-sector study to identify ways to strengthen NNSA's workforce robustness, resiliency, and ability to withstand competition from other public and private sector entities.
- Increases engagement with STEM talent through institutional engagements and events, builds a recognizable NNSA brand, and communicates NNSA's unique career opportunities (i.e., first in class facilities; service mission).

Pipeline Development
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Pipeline Development Program **$0**	**Pipeline Development Program** **$7,000,000**	**Pipeline Development Program** **+$7,000,000**
• New program to begin in FY 2024.	• Introduces students to pathways and careers in STEM within the NNSA. • Supports efforts including outreach, exposure to STEM activities, student and faculty engagement, and NNSA laboratories/plants/sites coordination. • Forms a Strategy Team consisting of various stakeholders to develop a comprehensive and integrated PD Strategy to expand and diversify the pool of workforce talent in the NSE.	• Creation of new subprogram to grow the workforce in disciplines vital to the nuclear security enterprise and to expand the pool of talent in science, technology, engineering, and mathematics to be recruited and cleared to work in the nuclear security enterprise

Academic Programs and Community Support
Community Capacity Building Program

Description

The Community Capacity Building Program will provide benefits to underserved communities, including Tribal Nations and rural areas, affected by the activities at NNSA sites. Benefits will include:

- Creating opportunities in communities experiencing job loss and economic hardship.
- Support projects to enable communities to restore and expand important functions, services, and resources
  - NNSA intends to explore multiple projects areas, including those related to environmental protection, business development, and health and welfare.
- Funding of infrastructure projects that stimulate the economy and increase community resilience such as broadband access and other investments.
- Enhancing outreach to ensure community engagement of historically underrepresented groups in decision making processes.
- Increasing educational capacity for students (grades K-16) and adults pursuing continuing education and skills training at community colleges, technical colleges, and training centers.
- Expanding opportunities for communities to engage with the national laboratories, plants, and sites (LPS) through professional and educational programming, externships, internships, apprenticeships, and community focus groups that bring together the community with LPS leadership to discuss and address community needs

Highlights of the FY 2024 Budget

- Identifies disadvantaged communities, including Tribal Nations, that have been affected by activities at NNSA sites.
- Forms one or more focus groups to interview leaders in the community and document the needs in the areas of job creation, community restoration projects, infrastructure projects, and educational capacity building.
- Develops metrics to track progress in supporting job creation, community restoration, infrastructure building, and educational capacity building to ensure program success and fulfillment of objectives.
- Investigates funding mechanisms, such as grant programs, that could be used to support job creation, community restoration, infrastructure building, and educational capacity building.
- Stands up pilot programs to provide support to one to three communities in any of the areas of job creation, community restoration, infrastructure support, or educational capacity building.
- Conducts analyses for possible future transfer of excess, NNSA-owned land to support community development.

FY 2025 – FY 2028 Key Milestones

- Builds on initial pilot program, either (a) expands support to additional communities or (b) provides additional program resources in communities supported by the pilot program.
- Tracks and documents metrics to ensure program success.
- Evaluates progress and reconvenes focus groups, as needed.
- Evaluates NNSA activities to determine if additional communities have been affected to include those communities in any opportunities resulting from the program.
- Evaluates funding mechanisms to determine improved ways of providing funding to affected communities.

Community Capacity Building Program
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Community Capacity Building Program $0	**Community Capacity Building Program $30,000,000**	**Community Capacity Building Program +$30,000,000**
• New program to begin in FY 2024.	• Identifies communities, including Tribal Nations and rural areas, that have been affected by activities at NNSA sites. • Forms focus groups to interview leaders in the community and document the needs in the areas of job creation, community restoration projects, infrastructure projects, and educational capacity building. • Develops metrics to track progress in supporting job creation, community restoration, infrastructure building, and educational capacity building to ensure program success and fulfillment of objectives. • Investigates funding mechanisms, such as grant programs, that could be used to support job creation, community restoration, infrastructure building, and educational capacity building. • Stands up pilot programs to provide support to one to three communities in any of the areas of job creation, community restoration, infrastructure support, or educational capacity building.	• Creation of new subprogram to bolster communities affected by activities at the NNSA sites in the areas of job creation, community restoration, infrastructure projects, and educational resources.

Infrastructure and Operations

Overview
The Infrastructure and Operations program maintains, operates, and modernizes the National Nuclear Security Administration (NNSA) infrastructure in a safe, secure, and cost-effective manner to support all NNSA programs. Infrastructure and Operations efforts provide a comprehensive approach to modernizing NNSA infrastructure while maximizing return on investment, enabling program results, and reducing enterprise risk. The program also plans, prioritizes, and constructs mission-enabling facilities and infrastructure.

Operations of Facilities
The Operations of Facilities program provides the funding required to operate NNSA facilities in a safe and secure manner. Operations of Facilities is fundamental to achieving NNSA's plutonium, uranium, tritium, lithium, high explosives, and other mission objectives. This program includes essential support such as water and electrical utilities; safety systems; lease agreements; and activities associated with Federal, state, and local environmental, worker safety, and health regulations.

Safety and Environmental Operations
The Safety and Environmental Operations program provides for the Department's Nuclear Criticality Safety Program (NCSP), Nuclear Safety Research and Development (NSR&D), Packaging subprogram, Long Term Stewardship (LTS) subprogram and Nuclear Materials Integration (NMI) subprogram. These activities support safe, efficient operation of the nuclear security enterprise through the provision of safety data, nuclear material packaging, environmental monitoring, and nuclear material tracking.

Maintenance and Repair of Facilities
The Maintenance and Repair of Facilities program (Maintenance) provides direct-funded maintenance activities across the NNSA enterprise for the recurring day-to-day work required to sustain and preserve NNSA facilities in a condition suitable for their designated purpose. These efforts include predictive, preventive, and corrective maintenance activities to maintain facilities, property, assets, systems, roads, and vital safety systems.

Recapitalization
The Infrastructure and Safety Recapitalization program is key to modernizing NNSA's infrastructure. A sustained investment in Recapitalization is needed to address numerous obsolete support and safety systems; revitalize facilities that are beyond the end of their design life; and improve the reliability, efficiency, and capability of core infrastructure to meet mission requirements. The Recapitalization program modernizes NNSA infrastructure by prioritizing investments including the acquisition of new facilities or projects to improve the condition and extend the life of structures, capabilities, and systems thereby improving the safety and quality of the workplace. Recapitalization investments help achieve operational efficiencies and reduce safety, security, environmental, and program risk.

The Recapitalization program includes minor construction and infrastructure upgrade projects, real property purchases, planning, general contractor support for construction project management, Other Project Costs (OPC) for Infrastructure and Operations funded mission enabling infrastructure, and deactivation and disposal of excess infrastructure.

Line-Item Construction
Infrastructure and Operations line-item construction projects are critical to revitalizing the infrastructure. These projects will replace obsolete, unreliable facilities and infrastructure to reduce safety and program risk while improving responsiveness, capacity, and capabilities. NNSA uses a prioritization methodology for mission enabling line-item construction that evaluates investments on closing mission gaps, reducing infrastructure risk and safety risk, improving sustainability, and reducing deferred maintenance.

Highlights of the FY 2024 Budget Request
The FY 2024 Budget Request for Infrastructure and Operations totals $2,767,126,000 which enables the long-term effort to modernize NNSA infrastructure. This Request includes an increase to Operations of Facilities to support NNSA's direct funded share of operations and utilities for Savannah River National Laboratory (SRNL) facilities, the Plutonium mission including the production of at least 30 pits per year at LANL, and the re-establishment of the Waste Characterization, Reduction and Repackaging Facility (WCRRF) as a Hazard Category 3 nuclear facility. The increase also supports waste

activities at Y-12 due to the resumption of waste shipments. The increase is partially offset by an adjustment to reduce uncosted balances. The decrease to the Safety and Environmental Operations program reflects an adjustment to reduce uncosted balances. The increase in Maintenance and Repair of Facilities supports NNSA's direct funded share of maintenance for SRNL facilities; site critical infrastructure at the Nevada National Security Site (NNSS) along the mission corridor to include the power backloop; global security needs at NNSS for the Area 12 Tunnel Complex, Radiological/Nuclear Countermeasures Test and Evaluation (RNCTEC), and Desert Rock Airstrip; and maintenance planning and execution capabilities supporting the mission. This increase supports the maintenance of the new John M. Googin Technology Development Facility for special materials and the repair needs for key high-risk projects at the Y-12 National Security Complex () to include the site-wide brine system and the West-End facility treatment tanks and site potable water tower control systems. The increase also supports the realignment of scope for the maintenance of DOE-owned Federal Field Office space from the Federal Salaries and Expenses (FSE) account to Maintenance and Repair of Facilities account. The increase to the Recapitalization: Infrastructure and Safety program supports the Kansas City Non-nuclear Expansion Transformation (KC NExT) plan, and the deactivation and disposal of excess infrastructure, including stabilization and risk reduction activities at high-risk facilities. The increase also reflects the realignment of scope for the acquisition, sustainment and disposoal of DOE-owned federal Field Office space from the FSE account to Infrastructure and Safety and the addition of general contract support for construction project management. The Request for Mission Enabling Construction is to support new starts for the TA-46 Protective Force Facility project at LANL, Plutonium Production Building project at LANL, and Analytic Gas Laboratory project at Pantex. It also supports the transition to construction for the Electrical Power Capacity Upgrade project at LANL.

Major Outyear Priorities and Assumptions

Outyear funding levels for Infrastructure and Operations total $12,665,326,000 for FY 2025 through FY 2028. Outyear priorities will focus on supporting the pit production mission, stockpile major modernization mission, Kansas City expansion, and the Infrastructure Modernization Initiative (IMI) goal of reducing Deferred Maintenance (DM) and continuing to modernize NNSA's infrastructure to reduce mission and safety risks through the application of an enterprise risk management methodology, with line item construction investments largely directed to mission enabling, plutonium, non-nuclear components, and design and certification infrastructure. Lastly, NNSA will seek operational efficiencies by deactivating and dispositioning facilities that are no longer needed, thereby reducing operations, maintenance, and recapitalization requirements.

Infrastructure Modernization Initiative

In the FY 2022 National Defense Authorization Act (NDAA), Congress amended the IMI goal from reducing DM by 30 percent by 2025 to reducing DM as a percentage of the Enterprise's replacement plant value by 45 percent by 2030. Baselined against FY 2017 data, the IMI challenges NNSA to reach a DM to replacement plant value (DM:RPV) ratio of 2.67 percent by 2030.

As part of the IMI, NNSA has deployed BUILDER, a system developed by the U.S. Army Corps of Engineers and recognized by the National Academy of Sciences as a best-in-class practice for infrastructure management. The BUILDER system uses comprehensive inventory, lifecycle, cost, and assessment data and risk-informed standards and policies to recommend repairs and replacements at the most opportune time, thus improving NNSA's ability to pinpoint and prioritize investments. Using BUILDER-based calculations provides a more accurate and transparent understanding of NNSA's infrastructure. Historical approaches had greatly underestimated the Replacement Plant Value (RPV) of NNSA's facilities (for example, RPV for Y-12's 9212 was historically $949 million and is now $4.7 billion). NNSA's new calculated RPV is $139.0 billion, of which $5.1 billion represents excess facilities. The DM costs are tied to the RPV (it costs more to repair a more expensive facility); therefore, as expected, DM increased along with the value of the enterprise in FY 2022. (Table 1).

As a result of our data-driven and risk-informed infrastructure tools, NNSA has transitioned from a financially driven (e.g., DM) to a risk-driven plan for improving infrastructure. While many of our projects will inherently reduce DM, DM reduction is not the primary metric driving project selection.

Table 1			
NNSA Deferred Maintenance (DM) as a Percentage of Replacement Plant Value (RPV) of Active Facilities			
Metric	**FY 2020**	**FY 2021**	**FY 2022**
DM	$5.8B	$6.1B	$6.5B
RPV	$116.3B	$121.5B	$133.9B
DM/RPV Ratio	5.00%	5.00%	4.84%

Note: DM & PRV totals exclude excess facilities and include KCNSC leased facilities

In response to GAO recommendations, the following information is provided to improve transparency in the budget. Table 2 below lists total DM at NNSA sites, including a breakdown of that DM at different stages of facilities' design lives.

Table 2				
NNSA Deferred Maintenance (DM) as of FY 2022 on Active and Excess Facilities ($K)				
Metric	**Total**	**% of Total DM**	**RPV**	**DM/RPV**
Total DM	6,570,053	100%	139,035,404	4.73%
DM on excess facilities	88,702	1.35%	5,092,634	1.74%
DM on active facilities	6,481,351	98.65%	133,942,770	4.84%
DM on facilities beyond their 40-year design life	4,713,976	71.75%	83,320,366	5.66%
DM on facilities within ten years of their 40-year design life	1,249,499	19.02%	20,435,527	6.11%
DM on facilities within the first 30 years of their 40-year design life	606,578	9.23%	35,279,510	1.72%

Approximately 90 percent of NNSA DM is associated with facilities that are approaching or surpassed their 40-year design life. As part of a prudent investment strategy, NNSA will intentionally not perform some of the maintenance and repair on facilities with near-term replacement strategies or those that are or soon will become excess. NNSA is prioritizing its investments based on reducing mission risk, and it will take time and sustained investment in new construction to replace aged facilities and reverse operational risks from this legacy infrastructure.

NNSA annually screens excess facilities to identify the highest risks to mission, workers, the public, and the environment to support risk-informed decision making. Table 3 lists the highest-risk facilities.

Table 3[a]			
NNSA's Highest-Risk Excess Facilities			
Site	**Facility**	**Year Built**	**Year Shut Down**
Y-12	Alpha 5, Building 9201-05[c]	1944	1983
Y-12	Beta 4, Building 9204-04[c]	1945	2007
Y-12	Production, Building 9206[c]	1944	1993
Y-12	Beta 1, Fusion Energy-Eng Tech, Building 9204-01[c,e]	1944	2011
Y-12	Beta 3, Isotope Separations, Building 9204-03[d,e]	1945	2016
LLNL	Heavy Elements Facility, Building 251[b,c]	1956	1995
LLNL	Livermore Pool-Type Reactor, Building 280[b,c,e]	1956	1980
LLNL	Rotating Target Neutron Source Facility, Building 292[c]	1979	1987
LLNL	Explosives & High-Pressure Testing, Building 343[c]	1960	2014
LANL	Ion Beam Facility, Building TA-3-0016[b,c]	1953	1999

[a]The FY 2023 table included the Plastics Building 16-0306 at LANL, which was dispositioned in February 2022
[b] Facilities for which disposition is currently funded and are in the process of being demolished
[c] Requires DOE EM to disposition
[d] Beta 3, Isotope Separations, Building 9204-03 currently cannot be disposed (designated historical)
[e] Non-NNSA owned

Infrastructure and Operations
Funding

	($K) FY 2022[a] Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Infrastructure and Operations					
Operating					
Operations of Facilities	**1,014,000**	**1,038,000**	**1,053,000**	**+15,000**	**1.4%**
Safety and Environmental Operations	**165,354**	**162,000**	**139,114**	**-22,886**	**-14.1%**
Maintenance and Repair of Facilities	**700,000**	**651,617**	**718,000**	**+66,383**	**10.2%**
Recapitalization				**+0**	
Infrastructure and Safety	600,000	561,663	650,012	+88,349	**15.7%**
Subtotal, Recapitalization	**600,000**	**561,663**	**650,012**	**+88,349**	**15.7%**
Total, Operating	**2,479,354**	**2,413,280**	**2,560,126**	**+146,846**	**6.1%**
Construction					
Mission Enabling Construction					
24-D-512, TA-46 Protective Force Facility, LANL	0	0	48,500	+48,500	0.0%
24-D-511, Plutonium Production Building, LANL	0	0	48,500	+48,500	0.0%
24-D-510, Analytic Gas Laboratory, PX	0	0	35,000	+35,000	0.0%
23-D-519, Special Material Facility, Y-12	0	49,500	0	-49,500	-100.0%
23-D-518, Plutonium Modernization Operations & Waste Management OfficeBuilding, LANL	0	48,500	0	-48,500	-100.0%
23-D-517, Electrical Power Capacity Upgrade, LANL	0	24,000	75,000	+51,000	212.5%
22-D-514, Digital Infrastructure Capability Expansion, LLNL	8,000	67,300	0	-67,300	-100.0%
Total, Mission Enabling Construction	**8,000**	**189,300**	**207,000**	**+17,700**	**9.4%**
Total, Infrastructure and Operations	**2,487,354**	**2,602,580**	**2,767,126**	**+164,546**	**6.3%**

[a] FY 2022 Enacted is in a comparable structure and does not reflect how the funding was actually funded.

Infrastructure and Operations
Outyear Funding

	($K) FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Infrastructure and Operations				
Operating				
Operations of Facilities	**1,115,000**	**1,136,000**	**1,181,000**	**1,210,000**
Safety and Environmental Operations	**155,758**	**154,560**	**154,462**	**154,264**
Maintenance and Repair of Facilities	**737,000**	**752,000**	**772,000**	**792,000**
Recapitalization				
Infrastructure and Safety	**786,031**	**796,913**	**848,686**	**838,352**
Subtotal, Recapitalization	**786,031**	**796,913**	**848,686**	**838,352**
Total, Operating	**2,793,789**	**2,839,473**	**2,956,148**	**2,994,616**
Mission Enabling Construction				
28-D-XXX NW Las Vegas New Office Space NNSS	0	0	0	14,000
27-D-XXX National Security Innovation Center Phase 2, LLNL	0	0	10,000	86,000
27-D-XXX Protective Forces Support Facility, LANL	0	0	48,700	0
27-D-XXX Weapon Engineering Science & Technology Laboratory, SNL	0	0	13,000	129,000
27-D-XXX Plutonium Engineering Support Building, LANL	0	0	48,700	0
27 D- XXX Maintenance Facility, Y-12	0	0	48,700	0
26-D-XXX National Security Innovation Center, LLNL	0	96,000	0	0
26-D-XXX Plutonium Program Accounting Building, LANL	0	48,700	0	0
25-D-XXX U1a Complex Access Shaft, NNSS	15,000	110,000	89,000	86,000
25-D-XXX Plutonium Mission Safety & Quality Building, LANL	48,500	0	0	0
24-D-512, TA-46 Protective Force Facility, LANL	0	0	0	0
24-D-511, Plutonium Production Building, LANL	0	0	0	0
24-D-510, Analytic Gas Laboratory, PX	0	0	0	0
23-D-519 Special Materials Facility, Y-12	0	0	0	0
23-D-518 Plutonium Modernization Operations & Waste Management Office Building, LANL	0	0	0	0
23-D-517 Electrical Power Capacity Upgrade, LANL	86,000	104,000	0	0
Total, Construction	**149,500**	**358,700**	**258,100**	**315,000**
Total, Infrastructure and Operations	**2,943,289**	**3,198,173**	**3,214,248**	**3,309,616**

Infrastructure and Operations
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Infrastructure and Operations	
Operating	
Operations of Facilities: The increase supports NNSA's direct funded share of operations and utilities for SRNL facilities, the Plutonium mission including the production of at least 30 pits per year at LANL, and the re-establishment of the WCRRF as a Hazard Category 3 nuclear facility. The increase also supports waste activities at Y-12 due to the resumption of waste shipments. The increase is partially offset by an adjustment to reduce uncosted balances.	**+15,000**
Safety and Environmental Operations: The decrease reflects an adjustment to reduce uncosted balances.	**-22,886**
Maintenance and Repair of Facilities: The increase supports NNSA's direct funded share of maintenance for SRNL facilities; site critical infrastructure at NNSS along the mission corridor to include the power backloop; global security needs at NNSS for Area 12 Tunnel Complex, RNCTEC, and Desert Rock Airstrip; and maintenance planning and execution capabilities supporting the mission. The increase supports the maintenance of the Googin facility for special materials and the repair needs for key high-risk projects at Y-12 to include the site-wide brine system and the West-End facility treatment tanks and site potable water tower control systems. The increase also reflects the realignment of scope for the maintenance of DOE owned federal Field Office space from the FSE account to Maintenance and Repair of Facilities account.	**+66,383**
Infrastructure and Safety Recapitalization: The increase supports the Kansas City Non-nuclear Expansion Transformation (KC NExT) plan, and the deactivation and disposal of excess infrastructure, including stabilization and risk reduction activities at high-risk facilities. The increase also reflects the realignment of scope for the acquisition, sustainment and disposoal of DOE owned federal Field Office space from the FSE account to Infrastructure and Safety and the addition of general contract support for construction project management.	**+88,349**
Total, Operating	**+146,846**

	FY 2024 Request vs FY 2023 Enacted ($)
Construction	
Mission Enabling Construction: Reflects new starts for the TA-46 Protective Force Facility project at LANL, the Plutonium Production Building project at LANL, and the Analytic Gas Laboratory project at Pantex. The increase also supports the transition to construction for the Electrical Power Capacity Upgrade project at LANL.	**+17,700**
Total, Construction	**+17,700**
Total, Infrastructure and Operations	**+164,546**

Infrastructure and Operations
Operations of Facilities

Description

The Operations of Facilities program provides the funding required to operate NNSA facilities in a safe manner. The program also supports the direct funded operations activities for NNSA missions at DOE-EM's Savannah River National Laboratory. Operations of Facilities is fundamental to achieving NNSA's plutonium, uranium, tritium, lithium, high explosives, and other mission objectives. It includes essential support such as water and electrical utilities, safety systems, lease agreements for facilities and land, emergency response services, and other critical systems. This program also provides resources for environment, safety, health, and quality (ESH&Q) costs associated with ensuring compliance with Federal, state, and local environmental, worker safety, and health regulations as well as applicable DOE Orders and Directives.

The Operations of Facilities program also funds waste management activities, including treatment, storage, and waste disposition of both hazardous and newly generated radiological wastes. It provides for the daily operations and staffing to ensure facilities, systems, and capabilities are available to meet mission requirements.

The program also supports the Safety Analytics, Forecasting, Evaluation, and Reporting (SAFER) platform that was developed as a data management capability to enable the conversion of currently available data (predominantly narrative reports) into useful information and visualizations for NNSA decision maker support.

FY 2022-FY 2028 site allocations for the Operations of Facilities program are provided in Table 4 below.

Table 4

Site	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Kansas City National Security Campus	98,000	90,000	85,000	90,000	92,000	96,000	96,000
Lawrence Livermore National Laboratory	82,000	82,000	80,000	83,000	84,000	84,000	84,000
Los Alamos National Laboratory	287,000	320,000	320,000	359,000	365,000	391,000	415,000
Nevada National Security Site	105,000	105,000	105,000	107,000	107,000	108,000	108,000
Pantex Plant	80,000	83,000	83,000	85,000	88,000	90,000	91,000
Sandia National Laboratories	125,000	106,000	103,000	106,000	107,000	108,000	109,000
Savannah River Site	97,000	95,000	95,000	97,000	97,000	98,000	98,000
Savannah River National Laboratory	0	0	34,000	35,000	37,000	38,000	40,000
Y-12 National Security Complex	104,000	104,000	105,000	110,000	117,000	123,000	126,000
Headquarters*	36,000	53,000	43,000	43,000	42,000	45,000	43,000
TOTAL	**1,014,000**	**1,038,000**	**1,053,000**	**1,115,000**	**1,136,000**	**1,181,000**	**1,210,000**

* The Operations of Facilities allocation under "Headquarters" includes funding for the Safety Analytics, Forecasting, Evaluation, and Reporting (SAFER) platform and to quickly respond to emergent unforeseeable issues. Funding is distributed to the sites during execution, which is consistent with industry best practices.

Operations of Facilities

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Operations of Facilities $1,038,000,000	**Operations of Facilities $1,053,000,000**	**Operations of Facilities +$15,000,000**
Funding supports base facility operations at: • Kansas City National Security Campus (KCNSC), supporting non-nuclear production. • Lawrence Livermore National Laboratory (LLNL), supporting plutonium, tritium, and high explosive nuclear security enterprise missions. • LANL, supporting plutonium production, including pit production, research, and development; chemistry and metallurgy research; weapons engineering and tritium capability; and beryllium operations. • NNSS, including experimental capabilities. • Pantex, including industrial and high explosives to support weapon assembly, disassembly, and surveillance in support of Stockpile Management (SM). • Sandia National Laboratories (SNL), including environmental testing and microelectronics technologies facilities. • Savannah River Site (SRS), including tritium and other capabilities. • Y-12, for enriched and depleted uranium, lithium, and other special material operations. • Headquarters (HQ), the SAFER platform to support enterprise-wide risk management applications.	Funding supports base facility operations at: • KCNSC, supporting non-nuclear production. • LLNL, supporting plutonium, tritium, and high explosive nuclear security enterprise missions. • LANL, supporting plutonium production, including pit production, research, and development; chemistry and metallurgy research; weapons engineering and tritium capability; and beryllium operations. • NNSS, including experimental capabilities. • Pantex, including industrial and high explosives to support weapon assembly, disassembly, and surveillance in support of the SM. • SNL, including environmental testing and microelectronics technologies facilities. • SRS, including tritium and other capabilities. • Savannah River National Laboratory, supporting NNSA's share of operations and utilities • Y-12, for enriched and depleted uranium, lithium, and other special material operations. • HQ, the SAFER platform to support enterprise-wide risk management applications.	• The increase supports NNSA's direct funded share of operations and utilities for Savannah River National Laboratory facilities, the Plutonium mission including the production of at least 30 pits per year at LANL, and the re-establishment of the WCRRF as a Hazard Category 3 nuclear facility. The increase also supports waste activities at Y-12 due to the resumption of waste shipments. The increase is partially offset by an adjustment to reduce uncosted balances.

Description

The Safety and Environmental Operations program provides for the Department's Nuclear Criticality Safety Program (NCSP), the NNSA's Nuclear Safety Research and Development (NSR&D) subprogram, Packaging subprogram, Long Term Stewardship (LTS) subprogram, and Nuclear Materials Integration subprogram (NMI). Table 5 provides the funding breakout for these subprograms.

NCSP develops, maintains, and disseminates the essential technical tools, training, and data required to support safe, efficient fissionable material operations within DOE. This includes maintaining and operating the National Criticality Experiments Research Center (NCERC) at NNSS where critical and sub-critical experiments are conducted to provide tests of nuclear data, analytical codes, and to develop new measurement methods.

The NSR&D subprogram provides the technical foundation for safety analyses and controls as well as authorization basis decision making for DOE/NNSA nuclear facilities and associated operations. The NCSP and NSR&D subprograms are vital to ensuring nuclear safety is maintained across the NNSA enterprise.

The Packaging subprogram ensures safe transport of nuclear and radiological materials by providing off-site shipping container research and development, design, certification, recertification, test and evaluation, production and procurement, fielding and maintenance, decontamination, and disposal. It also provides off-site transportation authorization of shipping containers for nuclear materials and components supporting both the nuclear weapons program and nuclear nonproliferation and other mission objectives.

The LTS subprogram ensures environmental safety at remediated sites with residual contamination by conducting activities necessary to meet Federal and state environmental regulatory requirements identified in legally enforceable records of decision, cleanup agreements, and consent orders. The LTS subprogram operates and maintains remediation systems, maintains institutional and engineering controls, and monitors contaminant levels in the soil, groundwater, and surface water. LTS is required to meet environmental requirements associated with corrective actions at sites that are subject to the Resource Conservation and Recovery Act (RCRA) or cleanup requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The LTS program also contributes to the Environmental Justice (J40) program by protecting worker health and the environment on the former Kansas City Plant (including vapor intrusion mitigation within newly constructed buildings) and minimizing the impact of legacy contamination on adjacent properties and surface waters.

The NMI subprogram maintains and operates the Nuclear Materials Management and Safeguards System (NMMSS), which tracks and accounts for nuclear materials at DOE and Nuclear Regulatory Commission-licensed sites, and the Nuclear Materials Inventory Assessment (NMIA) that manages use and demand of accountable nuclear materials by DOE and NNSA laboratories and production plants. In addition, NMI integrates management, consolidates, and coordinates disposal of excess accountable nuclear materials. NMI ensures that both older, unclaimed materials as well as materials currently in use have a viable disposition path. NMI monitors demand and consumption of nuclear materials and identifies future shortages. NMI addresses these potential shortages through focused projects with National Laboratories and educational institutions. NMI collaborates with the counterterrorism and intelligences communities to ensure critical materials are available for the nuclear forensics' community. NMI oversees and stewards nuclear materials managers at DOE/NNSA sites.

Table 5							
Subprogram	**FY 2022 Enacted**	**FY 2023 Enacted**	**FY 2024 Request**	**FY 2025 Request**	**FY 2026 Request**	**FY 2027 Request**	**FY 2028 Request**
Nuclear Criticality Safety Program	29,387	29,080	30,189	30,500	30,500	30,500	30,500
Nuclear Safety Research and Development	3,726	3,418	789	3,500	3,500	3,500	3,500
Packaging	25,683	24,986	21,977	26,000	26,000	26,000	26,000
Long Term Stewardship	77,173	75,021	62,290	71,000	70,000	70,000	70,000
Nuclear Materials Integration	29,385	29,495	23,869	24,758	24,560	24,462	24,264
TOTAL	**165,354**	**162,000**	**139,114**	**155,758**	**154,560**	**154,462**	**154,264**

Safety and Environmental Operations

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Safety and Environmental Operations $162,000,000	**Safety and Environmental Operations $139,114,000**	**Safety and Environmental Operations -$22,886,000**
Nuclear Criticality Safety Program $29,080,000	**Nuclear Criticality Safety Program $30,189,000**	**Nuclear Criticality Safety Program +$1,109,000**
• Provide technical infrastructure, expertise, and experimentation capabilities for the DOE encompassing the following technical elements: Nuclear Data, Analytical Methods, Training & Education, Information Preservation and Dissemination, and Integral Experiments. Integral experiments included the NCSP's NCERC to ensure criticality safety capabilities are adequate for the DOE mission.	• Provides technical infrastructure, expertise, and experimentation capabilities for the DOE encompassing the following technical elements: Nuclear Data, Analytical Methods, Training & Education, Information Preservation and Dissemination, and Integral Experiments. Integral experiments included the NCSP's NCERC to ensure criticality safety capabilities are adequate for the DOE mission.	• No significant changes.
Nuclear Safety Research and Development $3,418,000	**Nuclear Safety Research and Development $789,000**	**Nuclear Safety Research and Development -$2,629,000**
• Conduct projects to provide the technical foundation for safety analyses and controls as well as authorization basis decision making for DOE/NNSA nuclear facilities and associated operations.	• Conduct projects to provide the technical foundation for safety analyses and controls as well as authorization basis decision making for DOE/NNSA nuclear facilities and associated operations.	• The decrease reflects an adjustment to reduce uncosted balances.
Packaging $24,986,000	**Packaging $21,977,000**	**Packaging -$3,009,000**
• Refurbish, recondition, maintain, replace, and certify containers to ensure availability to support the nuclear weapons mission.	• Refurbish, recondition, maintain, replace, and certify containers to ensure availability to support the nuclear weapons mission.	• The decrease reflects an adjustment to reduce uncosted balances.
Long Term Stewardship $75,021,000	**Long Term Stewardship $62,290,000**	**Long Term Stewardship -$12,731,000**
• Support LTS regulatory required activities at the KC National Security Campus (Bannister site), LLNL (Main Site and Site 300), Pantex Plant, SNL, and Y-12. • LTS required activities include: treating contaminated ground water (including the	• Continue to support LTS regulatory required activities at the KC National Security Campus (Bannister site), LLNL (Main Site and Site 300), Pantex Plant, SNL, and Y-12. • LTS required activities include: treating contaminated ground water (including the	• The decrease reflects an adjustment to reduce uncosted balances.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Pantex offsite groundwater contamination plume); monitoring surface/ground water and soils; maintaining landfill remedies; performing CERCLA and RCRA 5-year remedy reviews of selected cleanup remedies; working with the Environmental Protection Agency regions and various states to meet post-completion regulatory cleanup and reporting requirements; addressing potential vapor intrusion studies and remedial activities, and working in concert with other federal agencies, states, and affected stakeholders to execute LTS activities in a cost effective, compliant, and safe manner consistent with end states.	Pantex offsite groundwater contamination plume); monitoring surface/ground water and soils; maintaining landfill remedies; performing CERCLA and RCRA 5-year remedy reviews of selected cleanup remedies; working with the Environmental Protection Agency regions and various states to meet post-completion regulatory cleanup and reporting requirements; addressing potential vapor intrusion studies and remedial activities, and working in concert with other federal agencies, states, and affected stakeholders to execute LTS activities in a cost effective, compliant, and safe manner consistent with end states.	
Nuclear Materials Integration $29,495,000	**Nuclear Materials Integration $23,869,000**	**Nuclear Materials Integration -$5,626,000**
• Maintain and operated the NMMSS for the United States Government. • Process sodium bonded fuels at Idaho National Laboratory (INL) originally used at SNL. • Plan and implement activities to recover Pu-244 from the Mk-18a target assemblies at SRS. • Treat, consolidate, and dispose of inactive actinides no longer needed for nuclear security missions at Oak Ridge National Laboratory (ORNL), LANL, and Y-12. • Ensure program direction and management of nuclear materials is effectively executed at each of the site offices. • Provide long-term forecasting, planning and analysis of materials. • Continue to support the emphasis on nuclear material consolidation and de-inventory activities across the NNSA nuclear security enterprise.	• Maintain and operate the NMMSS for the United States Government. • Process sodium bonded fuels at INL originally used at SNL. • Plan and implement activities to recover Pu-244 from the Mk-18a target assemblies at SRS. • Treat, consolidate, and dispose of inactive actinides no longer needed for nuclear security missions at ORNL, LANL, and Y-12. • Ensure program direction and management of nuclear materials is effectively executed at each of the site offices. • Provide long-term forecasting, planning and analysis of materials. • Continue to support the emphasis on nuclear material consolidation and de-inventory activities across the NNSA nuclear security enterprise.	• The decrease reflects an adjustment to reduce uncosted balances.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Continue activities to remove plutonium-bearing mixed oxide fuel.	• Continue activities to remove plutonium-bearing mixed oxide fuel.	

Infrastructure and Operations
Maintenance and Repair of Facilities

Description

The Maintenance and Repair of Facilities program provides direct-funded maintenance activities across the NNSA enterprise, including DOE owned federal Field Office space and DOE-EM facilities with NNSA mission functions at the Savannah River National Laboratory, for the recurring day-to-day work required to sustain and preserve facilities and equipment in a condition suitable for their designated purpose. These efforts include predictive, preventive, and corrective maintenance activities to maintain facilities, property, assets, systems, roads, and vital safety systems. This program also funds maintenance of excess facilities (including high-risk excess facilities) necessary to minimize the risk posed by those facilities prior to disposition.

Maintenance and Repair of Facilities is prioritized within an enterprise risk management framework based on mission needs; probability of failure of a system or a component; and risk determination with regard to safety, security, and environmental requirements. Investments focus on those structures, systems, and components that are considered essential to the national security mission. FY 2022-FY 2028 Infrastructure and Operations site allocations for direct-funded maintenance are provided in Table 6 below.

This program also funds the Roof Asset Management Program (RAMP) and the Cooling and Heating Asset Management Program (CHAMP). RAMP provides a dedicated approach to managing roofing assets through a single prioritized list of roofing needs across the nuclear security enterprise. The benefits of this approach enable the implementation of standard industry processes and best practices in the management of the roofing portfolio at a corporate level. Efficiencies are achieved by centralized procurement through leveraged buying power and long-term solutions instead of short-term repairs. The successful RAMP methodology has been expanded to other common components/systems under the Asset Management Program (AMP). Other systems will be analyzed as possible AMPs to achieve additional efficiencies.

Table 6

Site	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Kansas City National Security Campus	35,000	22,000	27,000	28,000	29,000	31,000	32,000
Lawrence Livermore National Laboratory	37,000	37,000	42,000	43,000	43,000	44,000	45,000
Los Alamos National Laboratory	150,000	145,000	151,000	160,000	166,000	169,000	170,000
Nevada National Security Site	65,000	70,000	70,000	72,000	72,000	73,000	77,000
Pantex Plant	115,000	108,000	118,000	119,000	120,000	121,000	123,000
Sandia National Laboratories	24,000	24,000	33,000	34,000	35,000	36,000	37,000
Savannah River Site	43,000	40,000	42,000	42,000	42,000	42,000	43,000
Savannah River National Laboratory	0	0	8,000	8,000	8,000	8,000	8,000
Y-12 National Security Complex	128,000	119,000	128,000	131,000	142,000	148,000	155,000
Enterprise Acquisitions*	103,000	86,617	99,000	100,000	95,000	100,000	102,000
TOTAL	**700,000**	**651,617**	**718,000**	**737,000**	**752,000**	**772,000**	**792,000**

* The Maintenance and Repair of Facilities allocation under "Enterprise Acquisitions" includes funding for Asset Management Programs, which achieve economies of scale and maintenance standardization for critical building systems that are common across the enterprise (e.g. roofs, HVAC) and to quickly respond to emergent unforeseeable issues. Funding is distributed to the sites during execution, which is consistent with industry best practices.

Maintenance and Repair of Facilities

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Maintenance and Repair of Facilities $651,617,000	**Maintenance and Repair of Facilities $718,000,000**	**Maintenance and Repair of Facilities +$66,383,000**
• KCNSC: maintenance of equipment and tenant improvement equipment. • LLNL: maintenance activities at Contained Firing Facility, Superblock, High Explosive Application Facility (HEAF), machine shops, and waste management facilities. • LANL: maintenance activities at Plutonium Facility 4 (PF-4), Chemistry and Metallurgy Research (CMR), Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT), Los Alamos Neutron Science Center (LANSCE), Beryllium, waste management, radiological laboratory, and tritium facilities. • NNSS: maintenance of Joint Actinide Shock Physics Experimental Research (JASPER), Big Explosives Experimental Facility (BEEF), Device Assembly Facility (DAF), and U1a. • Pantex: Bays and Cell maintenance, funded emerging requirements, and support high explosives activities. • SNL: maintenance activities at Microsystems Engineering, Science and Applications (MESA), Major Environmental Test Facilities (METF), and Tonopah. • SRS: maintenance on NNSA mission facilities and equipment and activities associated with gas transfer systems. • Y-12: maintenance for uranium and lithium operations. • Enterprise-wide: RAMP and CHAMP centralized procurement activities to increase buying power	• KCNSC: maintenance for Main Campus and Building 23. • LLNL: maintenance activities at Contained Firing Facility, Superblock, HEAF, machine shops, and waste management facilities. • LANL: maintenance activities at PF-4, CMR, DARHT, LANSCE, Beryllium, waste management, radiological laboratory, and tritium facilities. • NNSS: maintenance of JASPER, BEEF, DAF, and U1a. • Pantex: Bays and Cell maintenance, emerging requirements, and support for high explosives activities. • SNL: maintenance activities at MESA, METF, and Tonopah. • SRS: maintenance on NNSA mission facilities and activities associated with gas transfer systems. • Savannah River National Laborarоty: supports NNSA's share of maintenance • Y-12: maintenance for uranium and lithium operations. • Enterprise-wide: RAMP and CHAMP centralized procurement activities to increase buying power and accelerate repairs of systems/components that are common across the NNSA enterprise. • Provides for enterprise-wide activities to stabilize the condition of excess facilities to minimize risk to mission prior to disposition. • Provides for maintenance needs at DOE owned Field Offices and the John A. Gordon Albuquerque Complex.	• The increase supports NNSA's direct funded share of maintenance for SRNL facilities; site critical infrastructure at NNSS along the mission corridor to include the power backloop; global security needs at NNSS for Area 12 Tunnel Complex, RNCTEC, and Desert Rock Airstrip; and maintenance planning and execution capabilities supporting the mission. The increase supports the maintenance of the Googin Development facility for special materials and the repair needs for key high-risk projects at Y-12 to include the site-wide brine system and the West-End facility treatment tanks and site potable water tower control systems. The increase also reflects the realignment of scope for the maintenance of DOE owned federal Field Office space from the FSE account to Maintenance and Repair of Facilities account.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
and accelerate repairs of systems/components that are common across the NNSA enterprise. • Provide for enterprise-wide activities to stabilize the condition of excess facilities to minimize risk to mission prior to disposition.		

Infrastructure and Operations
Recapitalization

Description

The Infrastructure and Safety (I&S) Recapitalization program, key to modernizing NNSA infrastructure, prioritizes investments to improve the condition and extend the design life of the structures, capabilities, and/or systems. The program improves the reliability, sustainability, productivity, and efficiency of NNSA's infrastructure to reduce overall operating costs. It also reduces safety, environmental, and program risk associated with facilities and systems that are often well beyond their design life.

The I&S program includes costs for minor construction projects, real property purchases, projects that are expensed, general contract support for construction project management, and Other Project Costs (OPC) for mission enabling infrastructure line-item construction projects. I&S also funds deactivation and disposal of excess infrastructure, including stabilization and risk reduction activities at high-risk excess facilities, resulting in surveillance and maintenance cost avoidance and reduced risk to workers, the public, environment, and programs. Recapitalization projects incorporate energy conservation measures to the greatest extent practicable in support of sustainability and energy performance improvements.

NNSA established the Standard Acquisition and Recapitalization (STAR) initiative in May 2019 to develop streamlined, repeatable processes to standardize the design and construction of non-nuclear, low-risk facilities in order to lower cost and accelerate their delivery. Under the STAR initiative, NNSA has a growing library of designs for small office, light laboratory, parking, and fire station facilities that have been successfully built at various NNSA sites. Reusing designs from the library allows NNSA sites to reduce the time spent in design development, saving cost and up to several months in the overall implementation schedule.

NNSA is in the process of working with our Management and Operating (M&O) partners and an Architecture/Engineering firm to draft design standards for administrative buildings that will be common to all sites, similar to the Uniform Facility Criteria used across the Department of Defense. These standards are the predecessors to developing a standard, scalable core building design that will provide the flexibility needed to accommodate needs for new, commercial-like facilities while also simplifying the construction procurement process.

NNSA established the Energy Resilient Infrastructure and Climate Adaptation (ERICA) initiative in FY 2023 as part of a comprehensive infrastructure modernization strategy. ERICA is part of NNSA's multi-faceted approach to address climate adaptation and resilience in direct- and indirect-funded infrastructure programs and alternative financing (i.e., Energy Savings Performance Contracts, Utility Energy Service Contracts, and Utility Service Agreements).

Tables 7 show the plans for Recapitalization projects to be executed with FY 2024 funding based on the status of enterprise infrastructure as of February 2023. This plan may need to be updated before the FY 2024 execution year to respond to changing infrastructure conditions and requirements.

Table 7

National Nuclear Security Administration Infrastructure and Safety Planned FY 2024 Recapitalization Projects - As of February, 2023		
Site	**Project Name**	**FY 2024 Allocation ($K)**
KC	Bldg 23 North Additive Manufacturing Expansion Buildout [Design] (Minor Construction)	1,460
	Bldg 23 North Manufacturing Support Buildout [Design] (Minor Construction)	1,059
	Bldg 23 North Non-Destructive Testing & Environmental Lab Buildout [Design] (Minor Construction)	1,310
	Bldg 23 Advanced and Exploratory Technologies Area Buildout (Minor Construction)	20,577
	Bldg 23 North Surveillance Production Activities Expansion Buildout [Design] (Minor Construction)	1,436
	Bldg 23 North Expansion Infrastructure Upgrades (Minor Construction)	20,810
Subtotal, Kansas City National Security Campus		**46,652**
LLNL	U193 Site 200 Sewer Diversion Plant Facility Upgrade (Minor Construction)	15,175
	U291 Cooling Tower Upgrade [Design] (Minor Construction)	1,350
	B133 Chiller Replacements	16,375
	S200 and S300 EV Charging Stations Installation (ERICA) (Minor Construction)	1,000
	Site 200 U791 and U792 Electrical Utility Substation Upgrade (ERICA) [Design] (Minor Construction)	1,325
	Bldg 391 Optics and Materials Science Cleanroom Conversion (Minor Construction)	14,000
	New Livermore Federal Center Office Building (Minor Construction)	24,250
	Building 312 Disposition	5,572
Subtotal, Lawrence Livermore National Laboratory		**79,047**
LANL	TA-16 WETF Redundant Fire Detection Upgrade [Design] (Minor Construction)	850
	PF-4 Zone 1 Exhaust Fan Replacement	12,448
	SM-39 Window Replacement [Design] (Minor Construction)	1,500
	PF-4 Zone 2 Bleed Off Fans Replacement	10,317
	TA-55 Fire Suppression Water Line for Security Facilities (Minor Construction)	8,507
	PF-4 Lab Wall Penetrations & Drywall Replacements	5,200
	CMR Wings 5 & 7 Nuclear Material Decontamination and Non-Fixed Item Removal	4,350
	TA-15 Disposition of 2 High Explosives Facilities	2,056
	CMR Wings 2, 3 and 4 Basement and First Floor Utilities Disconnect	3,600
	TA-14,15 & 36 Disposition of 5 High Explosives Facilities	4,336
Subtotal, Los Alamos National Laboratory		**53,164**
NNSS	New U1a 02b Refuge Station (Minor Construction)	14,700
	New U1a Operations Support Facility - 01-380 (STAR) (Minor Construction)	18,500
	U1a Centralized Monitor and Control Center Installation [Design] (Minor Construction)	1,700
	U1a Underground Power Distribution Upgrade (ERICA) (Minor Construction)	11,500
	New Area 23 Mercury Solar PV & Storage (ERICA) [Design] (Minor Construction)	3,600
	12 Buildings in Mercury Disposition	3,500
Subtotal, Nevada National Security Site		**53,500**

National Nuclear Security Administration Infrastructure and Safety Planned FY 2024 Recapitalization Projects - As of February, 2023		
Site	**Project Name**	**FY 2024 Allocation ($K)**
PX	Bay & Cell RAMS, FDS, & Lead-In Improvements Portfolio	25,600
	Building 11-55 Toxic Vapor Monitoring System Replacement	500
	South Main Substation Switchgear, Capacitor Bank, & Controller Upgrade - 100 Circuit (ERICA) [Design] (Minor Construction)	1,900
	Building 12-063 Complex Facility Prep for Disposition (7 assets)	4,000
Subtotal, Pantex Plant		**32,000**
SNL	CA Electrical Substation 41, 42, 43 & 44 Upgrades (ERICA) [Design] (Minor Construction)	400
	MESA ELP Bldg 858N Hazardous Production Materials (HPM) Monitoring System/Midas Upgrade [Design] (Minor Construction)	150
	NM New TA-II Master Substation (ERICA) (Minor Construction)	16,650
	Weapons Evaluation and Testing Laboratory Addition - Lab & Office Space (WETL at PX) [Design] (Minor Construction)	1,500
	New Stockpile and Component Modernization Support Building (STAR) (Minor Construction)	15,000
	TA-III, V, & Remotes 5kV Substation Replacement (ERICA) (Minor Construction)	17,550
	New C964 Microgrid (ERICA) (Minor Construction)	1,000
	TTR Area 09 - Disposition of 4 Buildings	1,300
	Mt. Haleakala Building K1010 Disposition	467
Subtotal, Sandia National Laboratories		**54,017**
SRS	HANM Obsolete Oxygen Monitor Replacement Portfolio	1,300
Subtotal, Savannah River Site		**1,300**
Y-12	Bldg 9720-32 Facility Conversion [Design] (Minor Construction)	2,100
	Bldg 9212 North Potable and Fire Water Lateral Replacements	8,315
	Bldg 9995 Electrical Panel Replacement for 198/222 Feeders (Minor Construction)	4,374
	Elza Switchyard Facility Disposition (3 assets)	4,900
	9401-03A Legacy Material Removal	2,000
	Building 9706-02 Complex Preparation for Disposition (2 assets) (EOC D&D)	3,200
	9201-05 Ancillary Facility Disposition (7 assets)	5,000
Subtotal, Y-12 National Security Complex		**29,889**
	Planning, Assessments, Infrastructure Management Tools & Purchases	290,684
	Construction Other Project Costs (OPC)	9,759
Grand Total, Infrastructure and Safety		**650,012**

Recapitalization

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Recapitalization $561,663,000	**Recapitalization $650,012,000**	**Recapitalization +$88,349,000**
Infrastructure and Safety $561,663,000	**Infrastructure and Safety $650,012,000**	**Infrastructure and Safety +$88,349,000**
• Provide funds for needed investments in obsolete/aging facilities and infrastructure to improve safety, reliability, and working condition.	• Table 7 contains the current FY 2024 project plan as of February 2023. The table includes advanced funding for design of several complex, high priority projects for future year execution. Recapitalization funds are allocated in accordance with planned priorities but retain the flexibility to adjust efforts to address emerging changes in priorities and unplanned failures.	• The increase supports the Kansas City Non-nuclear Expansion Transformation (KC NExT) plan, and the deactivation and disposal of excess infrastructure, including stabilization and risk reduction activities at high-risk facilities. The increase also reflects the realignment of funding for the acquisition, sustainment and disposoal of DOE owned Federal Field Office space from the Federal Salaries and Expenses (FSE) account to Infrastructure and Safety account.

Infrastructure and Operations
Construction

The Construction program plays a critical role in revitalizing the nuclear security enterprise. Investments from this program will improve the responsiveness and utility of the infrastructure. The program is focused on two primary objectives: (1) identification, planning, and prioritization of the projects supporting national security objectives, and (2) development and timely and efficient execution of these projects. Table 8 shows the breakout of funding by line-item.

FY 2024 funding will support the transition to construction for the Electrical Power Capacity Upgrade project at LANL. The project will increase the LANL electrical transmission system capacity and the LANL distribution system capacity and redundancy. Current transmission/distribution capacity is insufficient to provide stable and reliable power supply essential to all future programmatic missions at LANL.

FY 2024 funding will support the Plutonium Production Building at LANL. The project will construct an approximately 66,000 square-foot two-story office facility located in Technical Area 63 of the Pajarito Corridor. The facility will provide approximately 300 workstations and conference rooms to enable modernization, supporting operational readiness, training, warehousing, and supply chain management.

FY 2024 funding will support the TA-46 Protective Force Facility project at LANL. The project will provide an approximately 30,000 square-foot new building for LANL's protective force. The facility will contain space for lockers, an armory, Weapons Equipment Issue Room (WEIR), weapon loading wall, muster room, and offices for shift commanders and supervisors.

FY 2024 funding will also support the Analytic Gas Laboratory project at Pantex. The project will provide a 12,000 – 15,000 square-foot single-story laboratory located in Zone 12 North.

Table 8

Project	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Mission Enabling Construction							
28-D-XXX, NW Las Vegas New Office Space, NNSS	0	0	0	0	0	0	14,000
27-D-XXX, Plutonium Engineering Support Building, LANL	0	0	0	0	0	48,700	0
27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL	0	0	0	0	0	13,000	129,000
27-D-XXX, National Security Innovation Center Phase 2, LLNL	0	0	0	0	0	10,000	86,000
27-D-XXX, Protective Forces Support Facility, LANL	0	0	0	0	0	48,700	0
27-D-XXX, Maintenance Facility, Y-12	0	0	0	0	0	48,700	0
26-D-XXX, National Security Innovation Center, LLNL	0	0	0	0	96,000	0	0
26-D-XXX, Plutonium Program Accounting Building, LANL	0	0	0	0	48,700	0	0
25-D-XXX, U1a Complex Access Shaft, NNSS	0	0	0	15,000	110,000	89,000	86,000
25-D-XXX, Plutonium Mission Safety & Quality Building, LANL	0	0	0	48,500	0	0	0
24-D-512, TA-46 Protective Force Facility, LANL	0	0	48,500	0	0	0	0
24-D-511, Plutonium Production Building, LANL	0	0	48,500	0	0	0	0
24-D-510, Analytic Gas Laboratory, PX	0	0	35,000	0	0	0	0
23-D-519, Special Materials Facility, Y-12	0	49,500	0	0	0	0	0
23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL	0	48,500	0	0	0	0	0
23-D-517, Electrical Power Capacity Upgrade, LANL	0	24,000	75,000	86,000	84,000	0	0
22-D-514, Digital Infrastructure Capability Expansion, LLNL	8,000	67,300	0	0	0	0	0
Total, Mission Enabling Construction	**8,000**	**189,300**	**207,000**	**149,500**	**358,700**	**258,100**	**315,000**

Construction

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Mission Enabling Construction $189,300,000	**Mission Enabling Construction $207,000,000**	**Mission Enabling Construction +$17,700,000**
• Transition to construction for the Digital Infrastructure Capability Expansion (DICE) project at LLNL. • Initiate design for the Electrical Power Capacity Upgrade project at LANL. • Initiate the Plutonium Modernization Operations & Waste Management Office Building at LANL. • Initiate the Special Materials Facility at Y-12 National Security Complex.	• Transition to construction for the Electrical Power Capacity Upgrade project at LANL. • Initiate the TA-46 Protective Force Facility project at LANL. • Initiate the Plutonium Production Building project at LANL. • Initiate the Analytic Gas Laboratory project at Pantex.	• Reflects new starts for the TA-46 Protective Force Facility project at LANL, Plutonium Production Building project at LANL, and Analytic Gas Laboratory project at Pantex. It also supports the transition to construction for the Electrical Power Capacity Upgrade project at LANL.

Construction Projects Summary

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Mission Enabling						
28-D-XXX, NW Las Vegas New Office Space, NNSS						
TEC	90,000	0	0	0	0	0
OPC	2,685	0	0	0	0	0
TPC, 28-D-XXX, NW Las Vegas New Office Space, NNSS	**92,685**	**0**	**0**	**0**	**0**	**0**
27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL						
TEC	142,000	0	0	0	0	0
OPC	5,423	0	0	175	2,570	+2,395
TPC, 27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL	**147,423**	**0**	**0**	**175**	**2,570**	**+2,395**
27-D-XXX, National Security Innovation Center Phase 2, LLNL						
TEC	96,000	0	0	0	0	0
OPC	1,975	0	0	0	175	+175
TPC, 27-D-XXX, National Security Innovation Center Phase 2, LLNL	**97,975**	**0**	**0**	**0**	**175**	**+175**
27-D-XXX, Protective Forces Support Facility, LANL						
TEC	48,700	0	0	0	0	0
OPC	1,513	0	0	0	175	+175
TPC, 27-D-XXX, Protective Forces Support Facility, LANL	**50,213**	**0**	**0**	**0**	**175**	**+175**
27-D-XXX Plutonium Engineering Forces Building, LANL						
TEC	48,700	0	0	0	0	0
OPC	1,513	0	0	0	175	+175
TPC, 27-D-XXX Plutonium Engineering Support Building, LANL	**50,213**	**0**	**0**	**0**	**175**	**+175**

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
27-D-XXX Maintenance Facility, Y-12						
TEC	48,700	0	0	0	0	0
OPC	1,513	0	0	0	175	+175
TPC, 27-D-XXX Maintenance Facility, Y-12	**50,213**	**0**	**0**	**0**	**175**	**+175**
26-D-XXX, National Security Innovation Center, LLNL						
TEC	96,000	0	0	0	0	0
OPC	3,139	0	0	175	1,800	+1,625
TPC, 26-D-XXX, National Security Innovation Center, LLNL	**99,139**	**0**	**0**	**175**	**1,800**	**+1,625**
26-D-XXX, Plutonium Program Accounting Building, LANL						
TEC	48,700	0	0	0	0	0
OPC	1,513	0	0	175	900	+725
TPC, 26-D-XXX, Plutonium Program Accounting Building, LANL	**50,213**	**0**	**0**	**175**	**900**	**+725**
25-D-XXX, U1a Complex Access Shaft, NNSS						
TEC	300,000	0	0	0	0	0
OPC	10,444	664	431	7,000	150	-6,850
TPC, 25-D-XXX, U1a Complex Access Shaft, NNSS	**310,444**	**664**	**431**	**7,000**	**150**	**-6,850**
25-D-XXX, Plutonium Mission Safety & Quality Building, LANL						
TEC	48,500	0	0	0	0	0
OPC	937	500	0	0	0	0
TPC, 25-D-XXX, Plutonium Mission Safety & Quality Building, LANL	**49,437**	**500**	**0**	**0**	**0**	**0**
24-D-512, TA-46 Protective Force Facility, LANL						
TEC	48,500	0	0	0	48,500	+48,500
OPC	1,500	1,500	0	0	0	0
TPC, 24-D-512, TA-46 Protective Force Facility, LANL	**50,000**	**1,500**	**0**	**0**	**48,500**	**+48,500**

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
	($K)					
24-D-511, Plutonium Production Building, LANL						
TEC	48,500	0	0	0	48,500	+48,500
OPC	1,000	500	0	0	0	0
TPC, 24-D-511, Plutonium Production Building, LANL	**49,500**	**500**	**0**	**0**	**48,500**	**+48,500**
24-D-510, Analytic Gas Laboratory, PX						
TEC	35,000	0	0	0	35,000	+35,000
OPC	1,000	175	0	0	0	0
TPC, 24-D-510, Analytic Gas Laboratory, PX	**36,000**	**175**	**0**	**0**	**35,000**	**+35,000**
23-D-519, Special Materials Facility, Y-12						
TEC	49,500	0	0	49,500	0	-49,500
OPC	500	0	0	0	0	0
TPC, 23-D-519, Special Materials Facility, Y-12	**50,000**	**0**	**0**	**49,500**	**0**	**-49,500**
23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL						
TEC	48,500	0	0	48,500	0	-48,500
OPC	1,548	48	1,300	0	0	0
TPC, 23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL	**50,048**	**48**	**1,300**	**48,500**	**0**	**-48,500**
23-D-517, Electrical Power Capacity Upgrade, LANL						
TEC	289,000	0	0	24,000	75,000	+51,000
OPC	14,140	7,703	3,626	0	0	0
TPC, 23-D-517, Electrical Power Capacity Upgrade, LANL	**303,140**	**7,703**	**3,626**	**24,000**	**75,000**	**+51,000**

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
22-D-514, Digital Infrastructure Capability Expansion, LLNL						
TEC	75,300	0	8,000	67,300	0	-67,300
OPC	2,700	1,706	134	150	150	0
TPC, 22-D-514, Digital Infrastructure Capability Expansion, LLNL	**78,000**	**1,706**	**8,134**	**67,450**	**150**	**-67,300**
18-D-660, Fire Station, Y-12						
TEC	28,000	28,000	0	0	0	0
OPC	5,270	4,828	442	0	0	0
TPC, 18-D-660, Fire Station, Y-12	**33,270**	**32,828**	**442**	**0**	**0**	**0**
15-D-613, Emergency Operations Center, Y-12						
TEC	28,919	28,919	0	0	0	0
OPC	5,068	4,741	327	0	0	0
TPC, 15-D-613, Emergency Operations Center, Y-12	**33,987**	**33,660**	**327**	**0**	**0**	**0**
15-D-612, Emergency Operations Center, LLNL						
TEC	32,000	32,000	0	0	0	0
OPC	3,200	2,600	600	0	0	0
TPC, 15-D-612, Emergency Operations Center, LLNL	**35,200**	**34,600**	**600**	**0**	**0**	**0**
15-D-611, Emergency Operations Center, SNL						
TEC	40,000	40,000	0	0	0	0
OPC	2,500	2,161	0	339	0	-339
TPC, 15-D-611, Emergency Operations Center, SNL	**42,500**	**42,161**	**0**	**339**	**0**	**-339**
Total, Mission Enabling						
TEC	1,690,519	128,919	8,000	189,300	207,000	+17,700
OPC	69,081	27,126	6,860	8,014	6,270	-1,744
TPC, Mission Enabling	**1,759,600**	**156,045**	**14,860**	**197,314**	**213,270**	**+15,956**

Outyears for Construction Projects Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
Mission Enabling					
28-D-XXX, NW Las Vegas New Office Space, NNSS					
TEC	0	0	0	14,000	76,000
OPC	175	1,700	0	0	810
TPC, 28-D-XXX, NW Las Vegas New Office Space, NNSS	**175**	**1,700**	**0**	**14,000**	**76,810**
27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL					
TEC	0	0	13,000	129,000	0
OPC	950	150	150	150	1,278
TPC, 27-D-XXX, Weapon Engineering Science & Technology Laboratory, SNL	**950**	**150**	**13,150**	**129,150**	**1,278**
27-D-XXX, National Security Innovation Center Phase 2, LLNL					
TEC	0	0	10,000	86,000	0
OPC	1,800	0	0	0	0
TPC, 27-D-XXX, National Security Innovation Center Phase 2, LLNL	**1,800**	**0**	**10,000**	**86,000**	**0**
27-D-XXX, Protective Forces Support Facility, LANL					
TEC	0	0	48,700	0	0
OPC	900	0	0	0	438
TPC, 27-D-XXX, Protective Forces Support Facility, LANL	**900**	**0**	**48,700**	**0**	**438**
27-D-XXX, Plutonium Engineering Support Building, LANL					
TEC	0	0	48,700	0	0
OPC	900	0	0	0	438
TPC, 27-D-XXX, Plutonium Engineering Support Building, LANL	**900**	**0**	**48,700**	**0**	**438**
27-D-XXX, Maintenance Facility, Y-12					
TEC	0	0	48,700	0	0
OPC	900	0	0	0	438
TPC, 27-D-XXX, Maintenance Facility, Y-12	**900**	**0**	**48,700**	**0**	**438**

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
	($K)				
26-D-XXX, National Security Innovation Center, LLNL					
TEC	0	96,000	0	0	0
OPC	0	150	150	864	0
TPC, 26-D-XXX, National Security Innovation Center, LLNL	**0**	**96,150**	**150**	**864**	**0**
26-D-XXX, Plutonium Program Accounting Building, LANL					
TEC	0	48,700	0	0	0
OPC	0	0	0	438	0
TPC, 26-D-XXX, Plutonium Program Accounting Building, LANL	**0**	**48,700**	**0**	**438**	**0**
25-D-XXX, U1a Complex Access Shaft, NNSS					
TEC	15,000	110,000	89,000	86,000	0
OPC	150	150	1,899	0	0
TPC, 25-D-XXX, U1a Complex Access Shaft, NNSS	**15,150**	**110,150**	**90,899**	**86,000**	**0**
25-D-XXX, Plutonium Mission Safety & Quality Building, LANL					
TEC	48,500	0	0	0	0
OPC	0	0	437	0	0
TPC, 25-D-XXX, Plutonium Mission Safety & Quality Building, LANL	**48,500**	**0**	**437**	**0**	**0**
24-D-512 ,TA-46 Protective Force Facility, LANL					
TEC	0	0	0	0	0
OPC	0	0	0	0	0
TPC, 24-D-512, TA-46 Protective Force Facility, LANL	**0**	**0**	**0**	**0**	**0**
24-D-511, Plutonium Production Building, LANL					
TEC	0	0	0	0	0
OPC	500	0	0	0	0
TPC, 24-D-511, Plutonium Production Building, LANL	**500**	**0**	**0**	**0**	**0**

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
24-D-510, Analytic Gas Laboratory, PX					
TEC	0	0	0	0	0
OPC	825	0	0	0	0
TPC, 24-D-510, Analytic Gas Laboratory, PX	**825**	**0**	**0**	**0**	**0**
23-D-519, Special Materials Facility, Y-12					
TEC	0	0	0	0	0
OPC	500	0	0	0	0
TPC, 23-D-519, Special Materials Facility, Y-12	**500**	**0**	**0**	**0**	**0**
23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL					
TEC	0	0	0	0	0
OPC	200	0	0	0	0
TPC, 23-D-518, Plutonium Modernization Operations & Waste Management Office Building, LANL	**200**	**0**	**0**	**0**	**0**
23-D-517, Electrical Power Capacity Upgrade, LANL					
TEC	86,000	104,000	0	0	0
OPC	0	0	2,811	0	0
TPC, 23-D-517, Electrical Power Capacity Upgrade, LANL	**86,000**	**104,000**	**2,811**	**0**	**0**
22-D-514, Digital Infrastructure Capability Expansion, LLNL					
TEC	**0**	**0**	**0**	**0**	**0**
OPC	560	0	0	0	0
TPC, 22-D-514, Digital Infrastructure Capability Expansion, LLNL	**560**	**0**	**0**	**0**	**0**
Total, Mission Enabling					
TEC	149,500	358,700	258,100	315,000	76,000
OPC	8,360	2,150	5,447	1,452	3,402
TPC, Mission Enabling	**157,860**	**360,850**	**263,547**	**316,452**	**79,402**

24-D-512, TA-46 Protective Force Facility
Los Alamos National Laboratory (LANL), Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary
The FY 2024 Request for the TA-46 Protective Force Facility (PFF) project is $48,500,000 of Total Estimated Cost (TEC) funding. The current Total Project Cost (TPC) range is $39,000,000 to $50,000,000. The project will provide a new facility for Los Alamos National Laboratory's (LANL's) protective force to enable them to continue providing the security services necessary to operate the lab. The FY 2024 Request fully funds all design and construction activities required for this project.

On October 13, 2017, the Deputy Secretary exempted non-nuclear, non-complex line-item construction projects with a Total Project Cost (TPC) less than $50 million from the requirements of the Department of Energy's (DOE) Order 413.3B, Program and Project Management for the Acquisition of Capital Assets, which offered an opportunity to develop a new delivery model for line-item projects in the $25-50 million cost range.

On June 21, 2019, NNSA launched a pilot to streamline the execution of low complexity construction projects using an "Enhanced Minor Construction – Commercial (EMC2)" approach and following the Deputy Secretary's exemption from DOE Order 413.3B requirements. The pilot implements the FY 2018 National Defense Authorization Act mandate to streamline non-nuclear construction projects less than $100 million.

On April 9, 2021, the NNSA Administrator approved expanding the EMC2 initiative pilot to include this facility at LANL for the uniformed wing of LANL's protective force to enable them to continue providing the security services necessary to operate the lab. The EMC2 pilot expansion will further advance streamlined acquisition initiatives that increase buying power and accelerate delivery of commercial-like infrastructure.

This project has a TPC below the applicability threshold of Order 413.3B and will be executed using the EMC2 approach.

Significant Changes
This project is a new start in FY 2024.

The TA-46 PFF project received Mission Need Statement and Program Requirements Document (MNS/PRD) approval on August 22, 2022. Project Management Executive (PME) authority was assigned to the Deputy Associate Administrator for the Office of Infrastructure Lifecycle Management (NA-91). During project planning, a Business Case Analysis was conducted and approved on April 29, 2022. The selected option indicated a cost range of $26,000,000 - $48,000,000 for a new facility for LANL's protective force. On June 3, 2020, a conceptual design was completed. The initial cost estimate was developed based on the conceptual design. The acquisition approach will be a firm fixed price Design-Build contract and will be a standard design and acquisition that can be repeated for delivery of subsequent demands in the future.

A Federal Project Manager (FPM) has been assigned to this project and has approved this construction project data sheet (CPDS).

Critical Milestone History

Fiscal Year	MNS/PRD	Conceptual Design Complete	Performance Baseline	Final Design Complete	Construction Mobilization	D&D Complete	Start of Operations
FY 2024	8/22/2022	6/3/2020	4Q FY 2023	3Q FY 2024	4Q FY 2024	N/A	3Q FY 2026

MNS/PRD – Approve Mission Need Statement and Program Requirements Document for a construction project with a conceptual scope and cost range.
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable).
Performance Baseline – Threshold cost, schedule, and scope commitment.
Final Design Complete – Estimated/Actual date the project design will be/was complete(d).
Construction Mobilization – First arrival of contractor personnel, equipment, supplies, and/or temporary facilities at the jobsite.
D&D Complete – Completion of D&D work.
Start of Operations – Achievement of project completion and readiness to use the system, facility, or capability.

Project Cost History ($K)

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2024	4,800	43,700	48,500	1,500	N/A	1,500	50,000

2. Project Scope and Justification

Scope
The TA-46 PFF project is a facility design and construction project. The project will provide an approximately 34,000 square foot (SF) new building for the uniformed wing of LANL's protective force. The facility will contain space for lockers, an armory, Weapons Equipment Issue Room (WEIR), weapon loading wall, muster room, and offices for shift commanders and supervisors. The facility will include necessary parking in a surface lot.

Justification
The 30 plutonium pits per year mission at LANL requires a doubling of the protective force from Fiscal Year (FY) 2019 levels to enable 24 hours a day, 7 days a week operations in Technical Area (TA) 55, two Material Access Area Entry Control Facilities into Plutonium Facility 4, and escorts for construction and maintenance activity within secure areas.

The existing Central Guard Station in TA-64 is at capacity without room for expansion. Non-uniformed occupants have been relocated out of the facility to avoid the approximately $8 million per year operational impact of shifting to a precinct model with several uniformed guard stations. However, forecasted uniformed protective force growth will exceed all available space within the Central Guard Station by 2027.

Because there is no available space near the existing Central Guard Station in TA-64 for development, the new facility will be located in TA-46. This site was selected because it is close to TA-55, located in the Pajarito Corridor, and the existing utility and road infrastructure was adequate to service the new building.

The project is being conducted in accordance with the project management concepts within DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, appendix C, paragraphs 1A-L, but is exempt from the Order. The EMC^2 approach uses minor construction project management processes, industry standard terminology for subcontractor terms and conditions, commercial quality controls, and streamlines Environmental, Safety, and Health while still meeting 10 Code of Federal Regulations Part 851 requirements.

Key Performance Parameters (KPPs)
The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of project completion. The Objective KPPs represent the desired project performance.

These KPPs will be finalized when the Performance Baseline is approved.

Key Performance Parameter	Description	Threshold	Objective
KPP-1	Lockers	570 personnel	Same as Threshold
KPP-2	WEIR Capacity	Sized for a 20-minute shift change	Same as Threshold
KPP-3	Loading Stations	Sized for a 20-minute shift change	Same as Threshold
KPP-4	Muster Room	2,300 SF	2,500 SF
KPP-5	Supervisory Station	345 SF	400 SF
KPP-6	Parking	Up to 420 spaces, drivable surface erosion control mat instead of paving	Up to 420 spaces, paved

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2024	4,800	4,800	4,800
Total Design	**4,800**	**4,800**	**4,800**
Construction			
FY 2024	43,700	43,700	9,700
FY 2025	0	0	29,000
FY 2026	0	0	5,000
Total Construction	**43,700**	**43,700**	**43,700**
TEC			
FY 2024	48,500	48,500	14,500
FY 2025	0	0	29,000
FY 2026	0	0	5,000
Total TEC	**48,500**	**48,500**	**48,500**
Other Project Costs (OPC)			
FY 2021	1,500	0	0
FY 2022	0	1,500	19
FY 2023	0	0	881
FY 2024	0	0	0
FY 2025	0	0	100
FY 2026	0	0	500
Total, OPC	**1,500**	**1,500**	**1,500**
Total Project Costs (TPC)			
FY 2021	1,500	0	0
FY 2022	0	1,500	19
FY 2023	0	0	881
FY 2024	48,500	48,500	14,500
FY 2025	0	0	29,100
FY 2026	0	0	5,500
Total TPC	**50,000**	**50,000**	**50,000**

4. **Details of Project Cost Estimate ($K)**

($K)		Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)				
Design				
	Design	4,400	0	TBD
	Federal Design Review Support	0	0	TBD
	Contingency	400	0	TBD
Total Design		**4,800**	**0**	**TBD**
Construction				
	Site Work	4,500	0	TBD
	Equipment	0	0	TBD
	Construction	34,800	0	TBD
	Federal Support	0	0	TBD
	Contingency	4,400	0	TBD
Total Construction		**43,700**	**0**	**TBD**
Total Estimated Cost (TEC)		**48,500**	**0**	**TBD**
Contingency, TEC		*4,800*	*0*	*TBD*
Other Project Costs (OPC)				
OPC except D&D				
	Analysis of Alternatives	0	0	TBD
	Conceptual Design	400	0	TBD
	CD-1 Documents/Fed Support	500	0	TBD
	Start-up	500	0	TBD
	Equipment Move	0	0	TBD
	Contingency	100	0	TBD
Total OPC		**1,500**	**0**	**TBD**
Contingency, OPC		*100*	*0*	*TBD*
Total Project Cost		**50,000**	**0**	**TBD**
Total Contingency (TEC+OPC)		***4,900***	***0***	**TBD**

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2024	TEC	0	0	0	48,500	0	0	0	0	0	48,500
	OPC	1,500	0	0	0	0	0	0	0	0	1,500
	TPC	1,500	0	0	48,500	0	0	0	0	0	50,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	3Q FY 2026
Expected Useful Life (number of years)	40
Expected Future Start of D&D of this capital asset (fiscal quarter)	3Q FY 2066

Related Funding Requirements ($M)

Funding Requirements	Annual Costs		Life Cycle Costs	
Estimate Totals	Previous Estimate	Current Estimate	Previous Estimate	Current Estimate
Operations and Maintenance	N/A	0.71	N/A	26.23

7. D&D Information

The new area being constructed in this project is not replacing existing facilities. LANL will D&D an offsetting amount of space in accordance with their current facility plan.

	Square Feet
New area being constructed by this project at LANL	34,000
Area of D&D in this project at LLNL	NA
Area at LANL to be transferred, sold, and/or D&D outside the project, including area previously “banked”	34,000
Area of D&D in this project at other sites	NA

8. Acquisition Approach

The TA-46 PFF project acquisition strategy is a firm fixed price Design-Build contract managed by the LANL Management & Operating contractor.

24-D-511, Plutonium Production Building
Los Alamos National Laboratory (LANL), Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2024 Request for the Plutonium Production Building project is $48,500,000 of Total Estimated Cost (TEC) funding. The current Total Project Cost (TPC) range is $46,000,000 to $50,000,000. The FY 2024 Request fully funds all design and construction activities required for this project.

The Plutonium Production Building project will support operational readiness and execution, training and mission services, and warehousing and supply chain management at Los Alamos National Laboratory (LANL).

On October 13, 2017, the Deputy Secretary exempted non-nuclear, non-complex line-item construction projects with a Total Project Cost (TPC) less than $50 million from the requirements of the Department of Energy's (DOE) Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets,* which offered an opportunity to develop a new delivery model for line-item projects in the $25-50 million cost range.

On June 21, 2019, NNSA launched a pilot to streamline the execution of low complexity construction projects using an "Enhanced Minor Construction – Commercial (EMC^2)" approach and following the Deputy Secretary's exemption from DOE Order 413.3B requirements. The pilot implements the FY 2018 National Defense Authorization Act mandate to streamline non-nuclear construction projects less than $100 million.

On April 9, 2021, the NNSA Administrator approved expanding the EMC^2 initiative pilot to include this $50 million office building at LANL that supports the Plutonium Modernization mission. The EMC^2 pilot expansion will further advance streamlined acquisition initiatives that increase buying power and accelerate delivery of commercial-like infrastructure.

Significant Changes

This project is a new start in FY 2024.

The project received Mission Need Statement and Program Requirements Document (MNS/PRD) approval on August 22, 2022. Project Management Executive (PME) authority was assigned to the Deputy Associate Administrator for the Office of Infrastructure Lifecycle Management (NA-91). On November 10, 2021, a conceptual design was completed for 23-D-518, Plutonium Modernization Operations & Waste Management Office Building, and charged to that project; this project reuses this conceptual design An initial cost estimate was developed based on the conceptual design.

The acquisition approach will be a firm fixed price Design-Build contract.

An NNSA Los Alamos Field Office Federal Project Manager (FPM) has been assigned to this project instead of a Federal Project Director (FPD).

Critical Milestone History

Fiscal Year	MNS/PRD	Conceptual Design Complete	Performance Baseline	Final Design Complete	Construction Mobilization	D&D Complete	Start of Operations
FY 2024	8/22/2022	11/10/2021	4Q FY 2023	3Q FY 2024	4Q FY 2024	N/A	3Q FY 2026

MNS/PRD – Approve Mission Need Statement and Program Requirements Document for a construction project with a conceptual scope and cost range.
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable).
Performance Baseline – Threshold cost, schedule, and scope commitment.
Final Design Complete – Estimated/Actual date the project design will be/was complete(d).

Construction Mobilization – First arrival of contractor personnel, equipment, supplies, and/or temporary facilities at the jobsite**.**
D&D Complete – Completion of D&D work
Start of Operations – Achievement of project completion and readiness to use the system, facility, or capability.

Project Cost History ($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2024	4,900	43,600	48,500	1,000	0	1,000	49,500

2. Project Scope and Justification

Scope
The project is a facility design and construction project. The project will provide an approximately 66,000 square foot (SF) new two-story office facility located in Technical Area 63 of the Pajarito Corridor. The facility will provide approximately 300 workstations and conference rooms to enable modernization, supporting operational readiness, training, warehousing, and supply chain management.

Justification
Additional workstations are required for employees needing routine access to the Technical Area (TA)-55 complex, other supporting modernization capabilities, including plutonium and others in TA-46, 48, 50, and 63. The missions supported by the additional employees include: Plutonium Modernization (including pit production), Plutonium Surveillance and Science, Plutonium Disposition, Pu-238 Programs, Material Recycle & Recovery, Americium Oxide Production, and other operational and logistical activities at LANL. The existing facilities in and around the TA-55 complex cannot accommodate the additional staff.

The project is being conducted in accordance with the project management concepts within DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, appendix C, paragraphs 1A-L, but is exempt from the Order. The EMC^2 approach uses minor construction project management processes, industry standard terminology for subcontractor terms and conditions, commercial quality controls, and streamlines Environmental, Safety, and Health while still meeting 10 Code of Federal Regulations Part 851 requirements.

Key Performance Parameters (KPPs)
The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of project completion. The Objective KPPs represent the desired project performance.

These KPPs will be finalized when the Performance Baseline is approved.

Key Performance Parameter	Description	Threshold	Objective
KPP-1	Classified Workstation Capacity	A classified workstation to unclassified workstation ratio of 80:20	100% classified workstations
KPP-2	Conference Room Capacity	Conference rooms capable of conducting classified / unclassified Video Teleconferences at 20 net square feet/occupant	Conference rooms capable of conducting classified / unclassified Video Teleconferences at 30 net square feet/occupant

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2024	4,900	4,900	4,900
Total Design	**4,900**	**4,900**	**4,900**
Construction			
FY 2024	43,600	43,600	9,700
FY 2025	0	0	29,100
FY 2026	0	0	4,800
Total Construction	**43,600**	**43,600**	**43,600**
TEC			
FY 2024	48,500	48,500	14,600
FY 2025	0	0	29,100
FY 2026	0	0	4,800
Total TEC	**48,500**	**48,500**	**48,500**
Other Project Costs (OPC)			
FY 2021	500	0	0
FY 2022	0	500	0
FY 2023	0	0	500
FY 2024	0	0	0
FY 2025	500	500	100
FY 2026	0	0	400
Total, OPC	**1,000**	**1,000**	**1,000**
Total Project Costs (TPC)			
FY 2021	500	0	0
FY 2022	0	500	0
FY 2023	0	0	500
FY 2024	48,500	48,500	14,600
FY 2025	500	500	29,200
FY 2026	0	0	5,200
Total TPC	**49,500**	**49,500**	**49,500**

4. Details of Project Cost Estimate

($K)

		Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)				
Design				
	Design	4,500	0	TBD
	Federal Design Review Support	0	0	TBD
	Contingency	400	0	TBD
Total Design		**4,900**	**0**	**TBD**
Construction				
	Site Work	4,000	0	TBD
	Title 3	3,000	0	TBD
	Construction	27,000	0	TBD
	Oversight	5,200	0	TBD
	Contingency	4,400	0	TBD
Total Construction		**43,600**	**0**	**TBD**
Total Estimated Cost (TEC)		**48,500**	**0**	**TBD**
Contingency, TEC		*4,800*	*0*	*TBD*
Other Project Costs (OPC)				
OPC except D&D				
	Analysis of Alternatives	0	0	TBD
	Conceptual Design	0	0	TBD
	Documents	500	0	TBD
	Start-up	400	0	TBD
	Equipment Move	0	0	TBD
	Contingency	100	0	TBD
Total OPC		**1,000**	**0**	**TBD**
Contingency, OPC		*100*	*0*	*TBD*
Total Project Cost		**49,500**	**0**	**TBD**
Total Contingency (TEC+OPC)		***4,900***	***0***	***TBD***

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2024	TEC	0	0	0	48,500	0	0	0	0	0	48,500
	OPC	500	0	0	0	500	0	0	0	0	1,000
	TPC	500	0	0	48,500	500	0	0	0	0	49,500

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	2Q FY 2026
Expected Useful Life (number of years)	40
Expected Future Start of D&D of this capital asset (fiscal quarter)	2Q FY 2066

Related Funding Requirements ($M)

Funding Requirements	Annual Costs		Life Cycle Costs	
Estimate Totals	**Previous Estimate**	**Current Estimate**	**Previous Estimate**	**Current Estimate**
Operations and Maintenance	N/A	1.55	N/A	57.27

7. D&D Information

The new area being constructed in this project is not replacing existing facilities. LANL will D&D an offsetting amount of space in accordance with their current facility plan.

	Square Feet
New area being constructed by this project at LANL	66,000
Area of D&D in this project at LLNL	NA
Area at LANL to be transferred, sold, and/or D&D outside the project, including area previously "banked"	66,000
Area of D&D in this project at other sites	NA

8. Acquisition Approach

The project acquisition is a firm fixed price Design-Build contract managed by the LANL Management & Operating contractor.

24-D-510, Analytic Gas Laboratory
Pantex Plant (PX), Amarillo, Texas
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2024 Request for the Analytic Gas Laboratory (Gas Lab) project is $35,000,000 of Total Estimated Cost (TEC) funding. The current Total Project Cost (TPC) range is $26,000,000 to $36,000,000. The FY 2024 Request fully funds all design and construction activities required for this project.

On October 13, 2017, the Deputy Secretary exempted non-nuclear, non-complex line-item construction projects with a TPC less than $50 million from the requirements of the Department of Energy's (DOE) Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets,* which offered an opportunity to develop a new delivery model for line-item projects in the $25-50 million cost range.

On June 21, 2019, NNSA launched a pilot to streamline the execution of low complexity construction projects using an "Enhanced Minor Construction – Commercial (EMC^2)" approach and following the Deputy Secretary's exemption from DOE Order 413.3B requirements. The pilot implements the FY 2018 National Defense Authorization Act mandate to streamline non-nuclear construction projects less than $100 million.

On April 9, 2021, the NNSA Administrator approved expanding the EMC^2 initiative pilot to include this laboratory at PX that supports the Bay & Cell production line. The EMC^2 pilot expansion will further advance streamlined acquisition initiatives that increase buying power and accelerate delivery of commercial-like infrastructure. This laboratory provides the gas analysis needed to support all the stockpile work performed at PX.

Significant Changes

This project is a new start in FY 2024.

On Feb. 28, 2019, an Issued For Construction design was completed under a Minor Construction project. The nine proposals received in March 2020 resulted in a TPC greater than the Minor Construction limit. Negotiations with the bidders failed to obtain the threshold scope within the Minor Construction limit, resulting in project cancellation on July 16, 2020. On April 9, 2021, the project was added to the EMC^2 line-item construction initiative.

The Gas Lab project received Mission Need Statement and Program Requirements Document (MNS/PRD) approval on August 22, 2022. Project Management Executive (PME) authority was assigned to the Deputy Associate Administrator for the Office of Infrastructure Lifecycle Management (NA-91).

A Federal Project Director has been assigned to this project and has approved this construction project data sheet (CPDS).

Critical Milestone History

Fiscal Year	MNS/PRD	Conceptual Design Complete	Performance Baseline	Final Design Complete	Construction Mobilization	D&D Complete	Start of Operations
FY 2024	8/22/2022	2/28/2019	4Q FY 2023	3Q FY 2024	4Q FY 2024	N/A	2Q FY 2026

MNS/PRD – Approve Mission Need Statement and Program Requirements Document for a construction project with a conceptual scope and cost range.
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable).
Performance Baseline – Threshold cost, schedule, and scope commitment.
Final Design Complete – Estimated/Actual date the project design will be/was complete(d).
Construction Mobilization – First arrival of contractor personnel, equipment, supplies, and/or temporary facilities at the jobsite**.**
D&D Complete – Completion of D&D work.

Start of Operations – Achievement of project completion and readiness to use the system, facility, or capability.

Project Cost History ($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2024	2,200	32,800	35,000	1,000	0	1,000	36,000

2. Project Scope and Justification

Scope

The Gas Lab project is a facility design and construction project. The project will provide a 12,000 – 15,000 square foot (SF) single-story laboratory located in Zone 12 North.

Justification

Gas analysis is required by the PX Bay & Cell production line to perform all stockpile surveillance, stockpile major modernization, and component requalification work. The existing facility performing gas analysis at PX was constructed in 1945. This building's deteriorating support systems are struggling to provide the environmental conditions necessary to operate the gas analysis equipment. When the support systems fail, gas analysis is unable to be performed, causing an outage for the Bay & Cell production line. These outages threaten the ability of PX to meet the mission deliverable schedule.

The project is being conducted in accordance with the project management concepts within DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, appendix C, paragraphs 1A-L, but is exempt from the Order. The EMC^2 approach uses minor construction project management processes, industry standard terminology for subcontractor terms and conditions, commercial quality controls, and streamlines Environmental, Safety, and Health while still meeting 10 Code of Federal Regulations Part 851 requirements.

Key Performance Parameters (KPPs)

The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of project completion. The Objective KPPs represent the desired project performance.

These KPPs will be finalized when the Performance Baseline is approved.

Key Performance Parameter	Description	Threshold	Objective
KPP-1	Total Usable floorspace	12,000 SF	15,000 SF
KPP-2	Secret/Restricted Data space	1,000 SF	2,000 SF

3. **Financial Schedule**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2024	2,200	2,200	2,200
Total Design	2,200	2,200	2,200
Construction			
FY 2024	32,800	32,800	3,900
FY 2025	0	0	23,200
FY 2026	0	0	5,700
Total Construction	32,800	32,800	32,800
TEC			
FY 2024	35,000	35,000	6,100
FY 2025	0	0	23,200
FY 2026	0	0	5,700
Total TEC	35,000	35,000	35,000
Other Project Costs (OPC)			
FY 2021	175	0	0
FY 2022	0	175	0
FY 2023	0	0	175
FY 2024	0	0	0
FY 2025	825	825	450
FY 2026	0	0	375
Total, OPC	1,000	1,000	1,000
Total Project Costs (TPC)			
FY 2021	175	0	0
FY 2022	0	175	0
FY 2023	0	0	175
FY 2024	35,000	35,000	6,100
FY 2025	825	825	23,650
FY 2026	0	0	6,075
Total TPC	36,000	36,000	36,000

4. Details of Project Cost Estimate ($K)

		($K) Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)				
Design				
	Design	2,000	0	TBD
	Federal Design Review Support	0	0	TBD
	Contingency	200	0	TBD
Total Design		2,200	0	TBD
Construction				
	Site Work	2,500	0	TBD
	Equipment	0	0	TBD
	Construction	20,000	0	TBD
	Title 3 Services	3,000	0	TBD
	Oversight	3,800	0	TBD
	Contingency	3,500	0	TBD
Total Construction		32,800	0	TBD
Total Estimated Cost (TEC)		35,000	0	TBD
Contingency, TEC		3,700	0	TBD
Other Project Costs (OPC)				
OPC except D&D				
	Analysis of Alternatives	0	0	TBD
	Conceptual Design[a]	0[a]	0	TBD
	Documents	175	0	TBD
	Start-up	450	0	TBD
	Equipment Move	275	0	TBD
	Contingency	100	0	TBD
Total OPC		1,000	0	TBD
Contingency, OPC		100	0	TBD
Total Project Cost		36,000	0	TBD
Total Contingency (TEC+OPC)		3,800	0	TBD

[a] Conceptual Design and Issue for Construction drawings performed for $2,217k as Minor Construction project.

5. **Schedule of Appropriations Requests**

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2024	TEC	0	0	0	35,000	0	0	0	0	0	35,000
	OPC	175	0	0	0	825	0	0	0	0	1,000
	TPC	175	0	0	35,000	825	0	0	0	0	36,000

6. **Related Operations and Maintenance Funding Requirements**

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	2Q FY 2026
Expected Useful Life (number of years)	40
Expected Future Start of D&D of this capital asset (fiscal quarter)	2Q FY 2066

Related Funding Requirements ($M)

Funding Requirements	Annual Costs		Life Cycle Costs	
Estimate Totals	**Previous Estimate**	**Current Estimate**	**Previous Estimate**	**Current Estimate**
Operations and Maintenance	N/A	0.38	N/A	14.04

7. **D&D Information**

Although the new area being constructed in this project is replacing space within existing facilities, other operations will continue within the existing building. PX will D&D an offsetting amount of space in accordance with its current facility plan.

	Square Feet
New area being constructed by this project at LLNL	15,000
Area of D&D in this project at LLNL	NA
Area at LLNL to be transferred, sold, and/or D&D outside the project, including area previously “banked”	15,000
Area of D&D in this project at other sites	NA

8. **Acquisition Approach**

The Gas Lab project acquisition plan is a Firm Fixed Price (FFP) design followed by a FFP construction contract managed by the PX Management & Operating contractor.

23-D-517, Electrical Power Capacity Upgrade
Los Alamos National Laboratory (LANL), Los Alamos, New Mexico
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary:
The FY 2024 Request for the Electrical Power Capacity Upgrade (EPCU) Project is $75,000,000 and will be used to begin construction activities and make long lead procurements. The project will resolve projected future shortfalls in the electrical transmission and distribution system at Los Alamos National Laboratory (LANL), increasing capability and improving reliability and resiliency. The approved CD-1 range is $214,947,756 to $349,000,000. The project achieved CD-1 on November 16, 2022. The high end of the preliminary CD-1 Class 3 estimate includes allowances above contingency and management reserve for market volatilities and uncertainties. Though the physical performance of the technical scope is lower risk, market volatility in the electric power transmission and distribution construction industry is very high; adjustments to the budgeted TPC will be made accordingly if volatility is realized.

Significant Changes:
- This Construction Project Data Sheet (CPDS) is an update of the FY 2023 CPDS and does not include a new start for the budget year. The design cost increase from the FY 2023 CPDS refines the allocation of funds between design and construction for a design-build contract. Increased OPCs were required to fund additional NEPA activities including the hiring of four Tribal monitors and additional site characterization.
- The CD-1 Independent Project Review (IPR) was completed on June 10, 2022 and recommended extending the completion date to align the project schedule with what has been found for similar construction work. The CD-4 date has been extended a year as a result of that recommendation. The $9.2 million increase from the previous TPC is also a result of addressing recommendations from the IPR.
- The power availability Key Performance Parameter (KPP) was removed as a result of the IPR as it is not a measurement of system performance at completion.

Critical Milestone History

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2023	8/24/2018	8/18/2021	4Q FY 2022	2Q FY 2024	4Q FY 2024	3Q FY 2024	N/A	1Q FY 2028
FY 2024	8/24/2018	8/18/2021	11/16/2022	4Q FY 2024	4Q FY 2024	4Q FY 2024	N/A	1Q FY 2029

CD-0 – Approve Mission Need
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Project Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work (see Section 9)
CD-4 – Approve Start of Operations or Project Completion

Project Cost History

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC Except D&D	OPC, D&D	OPC, Total	TPC
FY 2023	24,000	260,000	284,000	9,938	N/A	9,938	293,938
FY 2024	29,000	260,000	289,000	14,140	N/A	14,140	303,140

2. Project Scope and Justification

Scope

In support of LANL's mission growth, the EPCU project will improve the electrical power capacity for the Laboratory as it will allow load growth from 116 MVA (existing limit) up to a minimum of 200 MVA (future limit). Improvements include a new 115 KV import transmission line as well as one on-site line approximately 4.5 miles long, upgrades for three 115 KV/13.8 KV substations, addition of medium-voltage, underground, substation inter-tie circuits and switch gear, and addition of medium-voltage feeder circuits and switch gear to increase power capacity to support 60 MW for strategic computing platforms at LANL.

Justification

The mission of the project is to resolve the projected future shortfalls in the Laboratory's electrical transmission and distribution system to ensure it can reliably support the power demands from all programs performing work at LANL while maintaining compliance with applicable FERC/NERC requirements for utility operations. The site will exceed peak power demand for the Norton Line (NL), which is one of two main 115kV transmission lines that feeds power to LANL. The NL is forecasted to exceed its operating limit within the 2025/2026 timeframe without operational constraint. LANL anticipates an increase in power demands across several mission areas including: integrated nuclear programs, science & technology experiments, and infrastructure re-investment over the next ten years. While most of this demand growth is temporally distributed, growth in high-performance computing for large computing platforms is a key schedule driver. Without sufficient electrical capacity and capability, the DOE's and NNSA's core mission pillars at LANL will be compromised.

The funds appropriated under this data sheet may be used for contracted support services to the Federal Program Manager and the FPD to conduct independent assessments of the planning and execution of this project required by DOE O 413.3B and to conduct technical reviews of design and construction documents. The project is being conducted in accordance with the project management requirements in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets. As allowed by DOE O 413.3B, work will be phased to improve overall efficiency

Key Performance Parameters (KPPs)

Key Performance Parameters (KPPs) were established at CD-0. The Threshold KPPs consider minimum import capacity, power system reliability, distribution capacity to serve the Strategic Computing Center, and service restoration. Achievement of the Threshold KPPs is a prerequisite for approval of CD-4, *Project Completion*. KPPs will be finalized when the project is baselined at CD-2/3.

Performance Measure	Threshold KPP	Objective KPP
Power redundancy	T1 - Provide a minimum capacity of 200 MVA 100% redundancy, N-1, for all off-site and on-site transmission at 115 kV.	O1a - Provide 234 MVA capacity 100% redundancy, N-1, for all off-site and on-site transmission lines at 115 kV. O1b - Provide 266 MVA Capacity 100% redundancy, N-1, for all off-site and on-site transmission lines at 115 kV.
Power distribution	T2 - N-2, for substation transformers and substation interties and, N-1, for the balance of feeder circuits. (For example: If a long lead item fails (e.g., a distribution duct or transformer) the system will still operate while allowing maintenance or failure of a second major component.)	O2a – Provide active Volt-amp- reactive (VAR) devices support on key distribution circuits (voltage support). O2b – Provide additional substation interties to increase operational flexibility. O2c – Provide on-site storage to reduce peak demand and provide VAR power.
Power capacity	T3 – Provide 60 MVA capacity distribution feeder circuits and switchgear to SCC.	O3 – Provide 80 MVA capacity distribution feeder circuits and switchgear to SCC.

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2023	24,000	24,000	11,000
FY 2024	5,000	5,000	18,000
Total Design	**29,000**	**29,000**	**29,000**
Construction			
FY 2024	70,000	70,000	20,000
FY 2025	86,000	86,000	82,000
FY 2026	104,000	104,000	87,000
FY 2027	0	0	68,000
FY 2028	0	0	3,000
Total Construction	**260,000**	**260,000**	**260,000**
TEC			
FY 2023	24,000	24,000	11,000
FY 2024	75,000	75,000	38,000
FY 2025	86,000	86,000	82,000
FY 2026	104,000	104,000	87,000
FY 2027	0	0	68,000
FY 2028	0	0	3,000
Total TEC	**289,000**	**289,000**	**289,000**
Other Project Costs (OPC)			
FY 2019	1,038	1,038	355
FY 2020	2,616	2,616	1,958
FY 2021	4,049	4,049	2,784
FY 2022	3,626	3,626	2,497
FY 2023	0	0	3,735
FY 2024	0	0	0
FY 2025	0	0	0
FY 2026	0	0	0
FY 2027	2,811	2,811	1,350
FY 2028	0	0	1,461
Total, OPC	**14,140**	**14,140**	**14,140**
Total Project Costs (TPC)			
FY 2019	1,038	1,038	355
FY 2020	2,616	2,616	1,958
FY 2021	4,049	4,049	2,784
FY 2022	3,626	3,626	2,497

($K)

	Budget Authority (Appropriations)	Obligations	Costs
FY 2023	24,000	24,000	14,735
FY 2024	75,000	75,000	38,000
FY 2025	86,000	86,000	82,000
FY 2026	104,000	104,000	87,000
FY 2027	2,811	2,811	69,350
FY 2028	0	0	4,461
Total TPC	**303,140**	**303,140**	**303,140**

4. **Details of Project Cost Estimate**

($K)

		Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)				
Design				
	Design	25,200	20,200	TBD
	Contingency	3,800	3,800	TBD
Total Design		**29,000**	**24,000**	**TBD**
Construction				
	Site Work	4,054	0	TBD
	Equipment	50,672	0	TBD
	Construction	108,371	220,350	TBD
	Title III Services	6,080	0	TBD
	Oversight & Management	56,173	0	TBD
	Contingency	34,650	39,650	TBD
Total Construction		**260,000**	**260,000**	**TBD**
Total Estimated Cost (TEC)		**289,000**	**284,000**	**TBD**
Contingency, TEC		*38,450*	*43,450*	*TBD*
Other Project Costs (OPC)				
OPC except D&D				
	Conceptual Design	4,900	2,790	TBD
	Start-up	2,811	1,000	TBD
	Other Project Costs	6,429	5,786	TBD
	Contingency	0	362	TBD
Total OPC		**14,140**	**9,938**	**TBD**
Contingency, OPC		*0*	*362*	*TBD*
Total Project Cost		**303,140**	**293,938**	**TBD**
Total Contingency (TEC+OPC)		***38,450***	***43,812***	***TBD***

5. Schedule of Appropriation Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
FY 2023	TEC	0	0	24,000	95,000	86,000	79,000	0	0	284,000
	OPC	7,127	0	0	0	0	0	2,811	0	9,938
	TPC	7,127	0	24,000	95,000	86,000	79,000	2,811	0	293,938
FY 2024	TEC	0	0	24,000	75,000	86,000	104,000	0	0	289,000
	OPC	7,703	3,626	0	0	0	0	2,811	0	14,140
	TPC	7,703	3,626	24,000	75,000	86,000	104,000	2,811	0	303,140

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	1Q FY 2029
Expected Useful Life (number of years)	41
Expected Future Start of D&D of this capital asset (fiscal quarter)	1Q FY 2070

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Current Total Estimate	Previous Total Estimate	Current Total Estimate	Previous Total Estimate
Operations and Maintenance	4.08	3.54	160	159.3

7. D&D Information

There is no new area being constructed in this construction project. This scope of this project does not include adding any floor space to an existing facility.

8. Acquisition Approach

The Project will be managed and constructed by the LANL Management and Operating (M&O) contractor, which in turn will use a Design-Build firm fixed-price, best value procurement subcontract.

Secure Transportation Asset

Overview

The Secure Transportation Asset (STA) provides safe, secure transport of the Nation's nuclear weapons, weapon components, and special nuclear material throughout the nuclear security enterprise (NSE) to meet nuclear security requirements and support the broader National Nuclear Security Administration (NNSA) and Department of Energy (DOE) operations. Nuclear weapon life-extension programs, limited-life component exchanges, surveillance, dismantlement, nonproliferation activities, and experimental programs rely on safe, secure, and on-schedule transport of STA cargos.

The STA program includes the Operations and Equipment (OPS) and Program Direction (PD) subprograms. The OPS subprogram provides the STA's transportation service infrastructure required to meet NNSA's nuclear security activities as outlined in the Stockpile Stewardship and Management Plan. The PD subprogram provides salaries, travel, and other related expenses in support of Federal Agents (FA) and the secure transportation workforce.

STA currently has the mission capacity to meet NNSA stockpile sustainment priorities, strategic material and component transfers, and other DOE workloads. STA will continue to balance and prioritize customer requests against capacity. Since its establishment in 1974, STA has maintained its legacy of safety and security to include no loss of cargo and no radiological release on any shipment.

The FY 2024 Budget Request of $357,064,000 is 3.7% percent above FY 2023 Enacted. The Operations and Equipment budget supports modernization and sustainment of STA transportation assets, including life extension of the Safeguards Transporter (SGT) until replaced by the Mobile Guardian Transporter (MGT). The MGT First Production Unit (FPU) is planned for completion in FY 2028. Additionally, funding provides for replacement of convoy support vehicles and tractors, minor construction, command, and control system platforms, Nuclear Material Courier Basic (NMCB) training program, and approximately 300 management and operating, and support service contract personnel assisting in several areas encompassing aviation, information technology, and engineering. STA's Program Direction budget funds 537 federal Full Time Equivalents (FTEs) to include salary and benefits, workers' compensation, travel, professional development, DOE Common Operating Environment costs, and support service contracts funding approximately 94 FTEs (facility maintenance, healthcare/Human Reliability Program, intelligence, and administrative support). STA is continually strategizing to recruit and retain people with the essential skills to meet priorities and mission requirements and must consider the time it takes to achieve growth in the FA workforce due to the extensive hiring process, security clearances, and attrition. Strategies to attract, hire, and maintain the FA workforce are being implemented to support and increase FA end strength. Initiatives include increasing starting salary, offering recruitment incentives, and creating ladder positions.

Secure Transportation Asset
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Secure Transportation Asset					
Operations and Equipment	**213,704**	**214,367**	**239,008**	**+24,641**	**+11.5%**
Program Direction	**117,060**	**130,070**	**118,056**	**-12,014**	**-9.2%**
Total, Secure Transportation Asset	**330,764**	**344,437**	**357,064**	**+12,627**	**+3.7%**
Federal FTEs	**522**	**534**	**537**	**+3**	**+0.6%**

Secure Transportation Asset
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Secure Transportation Asset					
Operations and Equipment					
Mission Capacity	*59,188*	*57,628*	*60,500*	*+2,872*	*+5.0%*
Security/Safety Capability	*24,502*	*24,954*	*23,353*	*-1,601*	*-6.4%*
Infrastructure and C5 Systems	*30,286*	*29,816*	*47,301*	*+17,485*	*+58.6%*
Program Management	*11,395*	*9,034*	*8,888*	*-146*	*-1.6%*
Mobile Guardian Transporter	*88,333*	*92,935*	*98,966*	*+6,031*	*+6.5%*
Total Operations and Equipment	**213,704**	**214,367**	**239,008**	**+24,641**	**+11.5%**
Program Direction					
Salaries and Benefits	*91,942*	*100,214*	*87,250*	*-12,964*	*-12.9%*
Travel	*6,618*	*7,081*	*7,004*	*-77*	*-1.1%*
Other Related Expenses	*18,500*	*22,775*	*23,802*	*+1,027*	*+4.5%*
Total, Program Direction	**117,060**	**130,070**	**118,056**	**-12,014**	**-9.2%**
Total, Secure Transportation Asset	**330,764**	**344,437**	**357,064**	**+12,627**	**+3.7%**
Federal FTEs - Program Direction Funded	**522**	**534**	**537**	**+3**	**+0.6%**

Secure Transportation Asset
Outyear Funding

	FY 2025 Request ($K)	FY 2026 Request ($K)	FY 2027 Request ($K)	FY 2028 Request ($K)
Secure Transportation Asset				
Operations and Equipment	**255,709**	**275,073**	**319,644**	**315,603**
Program Direction	**135,264**	**138,100**	**140,997**	**149,113**
Total, Secure Transportation Asset	**390,973**	**413,173**	**460,641**	**464,716**
Federal FTEs	**542**	**546**	**541**	**541**

	FY 2025 Request ($K)	FY 2026 Request ($K)	FY 2027 Request ($K)	FY 2028 Request ($K)
Secure Transportation Asset				
Operations and Equipment				
Mission Capacity	*59,714*	*63,550*	*109,884*	*80,617*
Security/Safety Capability	*23,846*	*24,348*	*24,863*	*25,387*
Infrastructure and C5 Systems	*40,122*	*55,005*	*49,951*	*71,673*
Program Management	*8,808*	*8,951*	*9,139*	*9,340*
Mobile Guardian Transporter	*123,219*	*123,219*	*125,807*	*128,586*
Total Operations and Equipment	**255,709**	**275,073**	**319,644**	**315,603**
Program Direction				
Salaries and Benefits	103,493	105,716	107,965	115,444
Travel	7,142	7,281	7,432	7,578
Other Related Expenses	24,629	25,103	25,600	26,091
Total, Program Direction	**135,264**	**138,100**	**140,997**	**149,113**
Total, Secure Transportation Asset	**390,973**	**413,173**	**460,641**	**464,716**

Secure Transportation Asset
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Secure Transportation Asset (STA)	
Operations and Equipment:	**+24,641**
The increase reflects funding for MGT scheduled deliverables including Test Article 2 (TA2) Head-On Crash Test, Pre-Production Unit Assembly, Production Readiness Review, begin Post-Crash Test Reports, and begin Advanced Engineering Releases. Additional funding will support minor construction projects essential for replacement and refurbishment of aging facilities and mission requirements. Funding for the purchase of uniforms and/or uniform allowances has moved to PD from OPS to better align with the intent of 5 U.S.C. 7101-7102.	
Program Direction:	**-12,014**
The FY 2024 Budget provides salaries and benefits, travel, and other related expenses for FAs and the secure transportation workforce. The reduction accounts for projected carryover due to fewer planned FA graduates (two cancelled Nuclear Material Courier Basic [NMCB] courses in FY 2020 and FY 2021) and higher than normal attrition. The projected number of FTEs for FY 2024 is 537 which will be accomplished by holding three NMCB courses and considers NMCB candidates, attrition, risk, planned workload, and the ability to maintain the safety and security of mission-related requirements to fully support the NSE.	
Total, Secure Transportation Asset	**+12,627**

Secure Transportation Asset
Operations and Equipment

Description

The OPS subprogram includes providing unit training for FAs, specialized vehicles (such as highly secure trailers), and robust communications systems. Within the STA OPS subprogram, five activities make unique contributions to the safety and security of the nuclear stockpile. These activities accomplish the following:

(1) Mission Capacity – provides mission-essential agent equipment, maintenance, modification and replacement of the transportation fleet, and aviation services.
(2) Security/Safety Capability – Conducts NMCB training to increase the FA workforce, develops and implements new fleet technologies, executes agent sustainment training, and implements Security, Safety, and Emergency Response programs.
(3) Infrastructure and Command and Control, Communication, Computer and Cyber (C5) Systems – provides support for maintenance and minor construction projects and C5 systems.
(4) Program Management – provides corporate functions and business operations that control, assist, and direct secure transport operations.
(5) Mobile Guardian Transporter (MGT) – allows for the design, development, testing, and fabrication of the MGT.

Mission Capacity

Sustains STA systems through equipment purchases to fulfill transportation requirements. Asset maintenance is critical to support current and future missions. Current assets include agent equipment, vehicles (tractors, trailers, and escort vehicles), and aircraft. Modernizing and sustaining these assets requires an integrated, long-term strategy and substantial investment. STA's strategy includes retiring outdated assets, refurbishing existing assets to extend their useful life, and procuring new assets with increased capabilities to meet our customers ever changing needs and evolving threats. STA's efforts include:

- Regular replacement of older vehicles with new-vehicles which includes the design, engineering, testing, and fielding of specialized vehicles, tractors, and trailers necessary for successful convoy operations.
- Maintenance and sustainment of STA's aircraft fleet ensuring availability and reliability for mission operations.
- Sustain the required readiness posture of STA vehicles and aircraft fleet.

Security/Safety Capability

Sustains STA systems capacity through security and safety upgrades. This includes the following activities:

- Identify, design, and test new fleet and mission technologies. Deliverables include enhancements to the secure trailers, data analysis, information dissemination, and use of emerging physical security technology.
- Conduct NMCB classes to increase agent end-strength through training and equipping FA candidates with the best products and tools available for mission requirements.
- Sustain specialized FA skills and qualifications by providing technical equipment, logistics, curriculum development, and staffing necessary to conduct Special Response Force training, Operational Readiness Training (ORT), Validation Force-on-Force (VFoF) exercises, and Agent Sustainment Training. Sustainment Training includes surveillance detection, tactics, advanced driving skills, and firearm education. In addition, funding supports contracts for mission operation support and off-site training venues capable of supporting unit or FA commands during training activities.
- Maintain security and safety programs by conducting liaison activities with state and local law enforcement organizations, analysis of security methods and equipment, vulnerability assessments, development of Safeguards and Security Plans and combat simulation computer modeling. Furthermore, validation of needed safety and security measures, execution of safety studies recommendations and review of engineering analysis results, execution of Nuclear Explosive Safety protocols and risk reduction of over-the-road safety issues.
- Maintain the Emergency Operations Center and the Transportation and Emergency Control Center in Albuquerque, New Mexico, train, and exercise the STA emergency response capability. Includes the Emergency Management Program, FA Incident Command System refresher, and sustainment training.
- Evaluation, testing, and deployment of unmanned systems. The unmanned systems program continues to investigate, develop, acquire, and support the integration of unmanned technologies for use in the STA mission to conduct safe and

secure operations. Unmanned capabilities, air and ground, will enhance situational awareness during emergency or off-normal events involving critical STA mission assets.

Infrastructure and Command, and Control, Communication, Computer, and Cyber (C5)
Sustains the system platforms operated by STA. These systems provide critical information obtained, analyzed, and disseminated prior and during mission. Includes continuous monitoring of all data guaranteeing it is accurate/valid and constant communication within convoys, between convoys and headquarters (HQ) to ensure mission success. These activities must be accomplished in real-time while balancing cybersecurity requirements, reliability, and integrity. Additionally, STA leverages other systems technology supporting business processes and operations which improve efficiency and effectiveness of STA. This funding supports the following sub-elements:

- Modernize and sustain C5 systems activities to maintain vigilant oversight of nuclear convoys. Operate the Transportation Emergency Control Centers (TECC) and maintain the New Mexico Relay Station, and communications systems across the STA.
- Maintain and expand the Mission Management System, a secure unclassified to classified controlled interface. This allows communications from unclassified to classified systems, and maintenance and enhancement of a common operating picture for the TECC as well as convoys.
- Expand, upgrade, and maintain the STA facilities and equipment in support of mission requirements. STA is minimizing operational safety and health risks by addressing deferred maintenance. Facilities include FA commands, vehicle mechanical and electronic maintenance shops, training command, and support staff buildings. Activities to sustain these facilities include maintenance and minor construction projects.

Program Management
Creates a well-managed, responsive, and accountable organization by employing effective business practices for the STA program. This activity includes:

- Corporate functions such as technical document support and business processes that control, assist, and direct secure transport operations (includes supplies, equipment, and regulation control procedures).
- Assess, evaluate, and improve functions and processes including self-assessments, configuration management, quality assurance program, and business integration activities.

Mobile Guardian Transporter (MGT)
Provides for the design, production, and testing of the MGT which is the replacement for the existing SGT. The MGT will assure the safety and security of cargo and containers, protect the public, meet nuclear explosive safety requirements associated with accident scenarios, reduce the risk to security threats, and provide for enhanced communications. This includes the following activities:

- Test Article (TA) Assembly and Testing
- Mechanical Systems Development
- Electronics and Auxiliary Systems Development
- Active Delay System Development
- Enhanced Cargo Restraint Development

Highlights of the FY 2024 Budget Request
The FY 2024 Request includes the development, design, production, and maintenance of specialized mission vehicles, tractors, trailers, escort vehicles, training of FAs, and robust communications systems.

FY 2024 Funding Specifically Supports:

- Life extension and risk reduction activities for the aging SGT to ensure the fleet continues to meet the Nuclear Explosive Safety Study requirements associated with transporting nuclear weapons and components until the MGT is fully deployed.
- Build of the MGT, specifically, TA2 Head-On Crash Test, Completion of the Pre-Production Unit (PPU) Assembly, Production Readiness Review, begin Post-Crash Test Reports, continued PPU Development, and begin Advanced Engineering Releases.
- Replacement and refurbishment of armored tractors, escort vehicles, and support vehicles.

- Maintenance of existing facilities required by DOE Order 430.1C and minor construction projects of new and existing facilities to include construction of the Agent Operations Central Command Vehicle Maintenance Facility.
- Sustainment of system platforms operated by STA, including continuous monitoring of all data and communication within and between convoys and headquarters to ensure mission success.

FY 2025 – FY 2028 Key Milestones

- Delivery of MGT FPU in FY 2028.
- Lifecycle replacement of 737-400 aircraft in FY 2027.
- Facility and minor construction projects across STA sites, including construction of the Training Command Multi-Use Facility, Agent Operations Central Command Federal Agent Facility, Agent Operations Western Command Military Operations in Urban Terrain Site, and indoor firing ranges at Agent Operations Central Command and Agent Operations Western Command.

FY 2022 Accomplishments

- Completed 85 weapon/special nuclear materials shipments and made over 63 limited-life component deliveries without incident.
- MGT:
  - Released TA1 timeline and testing results.
  - Began TA2 assembly build.
  - Procured parts for the PPU build for the trailer assembly.
  - Released initial drawings for design testers.
  - Initiated build of the qualification and production testers.
  - Completed TA2 Over-the-Road Test.
  - Completed PPU Rolling Chassis build.
  - Commenced product specification releases to the Production Agency.
- Awarded contract to construct the Agent Operations Western Command Vehicle Maintenance Facility in Albuquerque, New Mexico.

Operations and Equipment

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Operations and Equipment $214,367,000	**Operations and Equipment $239,008,000**	**Operations and Equipment +$24,641,000**
Mission Capacity $57,628,000	**Mission Capacity $60,500,000**	**Mission Capacity +$2,872,000**
• Fielding prototypes for next generation Escort Vehicle (EV4). • Award contract to begin design, development, and production of the next generation Armored Tractor T4. • Vehicle sustainment efforts to continue redesign of the TCU. • Risk reduction initiatives for sustainment of the SGT until MGT is fully integrated into mission operations.	• Production of 8 to 10 next generation EV4 vehicles. • Design and development of the next generation T4 first production unit and additional units. • Vehicle sustainment efforts to continue redesign of the TCU to support the next generation armored tractor and communications with the new MGT. • Risk reduction initiatives for sustainment of the SGT until MGT is fully integrated into mission operations. • Replacement of 500 aging and unserviceable laser aiming devices to support operational and training guns at all STA sites.	• Replacement of 500 aging and unserviceable laser aiming devices to support operational and training weapons at all STA sites.
Security/Safety Capability $24,954,000	**Security/Safety Capability $23,353,000**	**Security/Safety Capability -$1,601,000**
• Equipment and services to support NMCB courses. • Conduct an ORT exercise and VFoF exercise. • Conduct annual Security Site Survey and Staff Assistance Visits. • Conduct the National Incident Management System/Incident Command System training program for FAs and staff. • Replacement of two Logistical Support Trailers critical for mobile training storage.	• Equipment and services to support NMCB courses. • Conduct an ORT exercise and VFoF exercise. • Conduct annual Security Site Survey and Staff Assistance Visits. • Conduct the National Incident Management System/Incident Command System training program for FAs and staff.	• Complete purchase of two Logistical Support Trailers in FY 2023.
Infrastructure and C5 Systems $29,816,000	**Infrastructure and C5 Systems $47,301,000**	**Infrastructure and C5 Systems +$17,485,000**
• Conduct maintenance and minor construction projects at the FA commands, training facility, and STA HQs, including build of the Vehicle	• Conduct maintenance and minor construction projects at the FA commands, training facility, and STA HQs, including construction of Agent	• Support minor construction projects for replacement and refurbishment of aging facilities and FA training, including construction of the Agent Operations Central Command Vehicle Maintenance Facility.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Maintenance Facility at Agent Operations Central Command in Amarillo, Texas. • Continue implementation and maintenance of applications and systems that interconnect communications with STA vehicles and the TECC. • Support advanced cyber threat intelligence capabilities and integrate awareness into mission operations.	Operations Central Command Vehicle Maintenance Facility. • Continue implementation and maintenance of applications and systems that interconnect communications with STA vehicles and the TECC. • Support advanced cyber threat intelligence capabilities by reducing operational risk that adjusts to changing threats, vulnerabilities, and needs.	
Program Management $9,034,000	**Program Management $8,888,000**	**Program Management -$146,000**
• Conduct Quality Assurance assessments. • Continue corporate business services and integration activities.	• Conduct Quality Assurance assessments. • Continue corporate business services and integration activities.	• Reduction reflects completion of activity by support service contractor in FY 2023.
Mobile Guardian Transporter $92,935,000	**Mobile Guardian Transporter $98,966,000**	**Mobile Guardian Transporter +$6,031,000**
• Continue Development of Engineering Releases. • Continue PPU stage builds. • Validate PPU manufacturing processes.	• TA2 Head-On Crash Test. • Completion of Pre-Production Unit Assembly. • Production Readiness Review. • Begin Post-Crash Test Reports. • Continued PPU development. • Start Advanced Engineering Releases.	• TA2 Head-On Crash Test. • Completion of Pre-Production Unit Assembly. • Production Readiness Review. • Begin Post-Crash Test Reports. • Continued PPU development. • Start Advanced Engineering Releases.

Secure Transportation Asset
Program Direction

Description

The Secure Transportation Asset (STA) Program Direction subprogram provides personnel ensuring the safety and security of the nuclear stockpile. The total planned Full Time Equivalents (FTE) supports the Federal Agent (FA) force, federal pilots, emergency management plans/activities, security and safety programs, and other key elements of the STA mission. STA is committed to a stable human resources strategy to achieve an optimal agent force to meet the National Nuclear Security Administration (NNSA) nuclear security enterprise priorities and mission requirements. The optimal FA force is determined by analysis of the projected workload and the resources required to support the NSE weapon modernization and production schedule. STA continues to execute three Nuclear Material Courier Basic (NMCB) courses per FY and are implementing initiatives to attract, hire, and maintain the FA workforce by increasing starting salary for incoming FAs, offering recruitment and retention bonuses, and creating ladder positions to provide quicker growth to high performing FAs.

Salaries and Benefits

Provides for the program staff located at Albuquerque, New Mexico; Fort Chaffee, Arkansas; and Washington, District of Columbia; and for FAs and support staff at three FA force locations in Albuquerque, New Mexico; Oak Ridge, Tennessee; and Amarillo, Texas. Funding is for salaries, overtime, worker's compensation, and health/retirement benefits associated with FAs, secondary positions, and support staff.

Travel

Travel funds utilized for secure convoys, training at military installations and other facilities, and program oversight.

Other Related Expenses

Provides required certification training for the handling of nuclear materials by FAs as well as staff and FA professional development. It maintains the Human Reliability Program (HRP) for FAs and designated staff, provides for Energy Information Technology (IT) Services/DOE Common Operating Environment (EITS/DOECOE), and other contractual service requirements, to include facility maintenance. Provides for uniforms or allowances for uniforms, as authorized by 5 U.S.C. 5901-5902 for select OST staff as outlined in OST policy 1.22D.

Highlights of the FY 2024 Budget Request

The FY 2024 PD Budget Request supports FA and staff FTEs for STA mission execution and priorities. This includes:

- Support for 537 FTEs.
- Travel to support mission and training requirements.
- Funding to support Energy Information Technology Services / Department of Energy Common Operating Environment (EITS/DOECOE) fees, support service contracts, Human Reliability program, and facility maintenance costs.
- Professional development training for FAs and staff to include Academic Degree Programs and college tuition reimbursements.

FY 2025 – FY 2028 Key Milestones

- Continue to support FA and staff FTEs, travel for mission and training requirements, EITS/DOECOE fees and service support contracts.

FY 2022 Accomplishments

- Completed 3 NMCB courses and graduated 33 new FAs.
- Completed 85 weapon/special nuclear materials shipments and made over 63 limited-life component deliveries without incident.

Program Direction

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Program Direction $130,070,000	**Program Direction $118,056,000**	**Program Direction -$12,014,000**
Salaries and Benefits $100,214,000	**Salaries and Benefits $87,250,000**	**Salaries and Benefits -$12,964,000**
• Recruit, hire, and retain quality personnel based on current and future mission needs. • Fill FA and staff vacancies to sustain workload requirements. Supports 572 FTEs. • Conduct three NMCB courses (projections consider gains from NMCB and losses due to mandatory retirements and attrition).	• Recruit, hire, and retain quality personnel based on current and future mission needs. • Conduct three NMCB courses (projections consider gains from NMCB and losses due to mandatory retirements and attrition).	• The reduction accounts for projected carryover due to fewer planned FA graduates (two cancelled NMCB courses in FY 2020 and FY 2021) and higher than normal attrition.
Travel $7,081,000	**Travel $7,004,000**	**Travel -$77,000**
• Travel required to transport nuclear weapons, components, and special nuclear material. • Funding to support travel to facilities that provide unique training to maintain agent skill sets. • Charter plane contract funded biennially as a contingency plan to support requirements when current STA aircraft is unavailable.	• Travel required to transport nuclear weapons, components, and special nuclear material. • Funding to support travel to facilities that provide unique training to maintain agent skill sets. • Charter plane contract funded annually as a contingency plan to support requirements when current STA aircraft is unavailable.	• Funding for the charter plane contract adjusted to annually instead of biennially; reduced the FY 2024 requirement.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Other Related Expenses $22,775,000	**Other Related Expenses $23,802,000**	**Other Related Expenses +$1,027,000**
• Continuous medical evaluations of individuals assigned to HRP duties and additional medical training for STA FA medics. • Support NMCB candidate training at the Federal Law Enforcement Training Center. • Support for mandatory ethics/integrity training for new STA employees. • Support processing of security clearances. • Support EITS/DOECOE costs. • Support service contracts for facility maintenance, intelligence analysts, and other administrative staff at multiple STA sites in Albuquerque and Arkansas.	• Continuous medical evaluations of individuals assigned to HRP duties and additional medical training for FA medics. • Support NMCB candidate training at the Federal Law Enforcement Training Center. • Support processing of security clearances. • Support EITS/DOECOE costs. • Support service contracts for facility maintenance, intelligence analysts, and other administrative staff at multiple STA sites in Albuquerque and Arkansas. • Support uniforms or uniform allowance as authorized by 5 U.S.C. 7901 – 7902.	• Additional IT/DOECOE (hardware/software) requirements in FY 2024.

Secure Transportation Asset
Capital Equipment

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	2,475	2,656	2,839	+183
Mobile Guardian Transporter	442,000	0	0	0	0	0
Replacement Aircraft (Lifecycle Replacement 737)	45,000	0	0	0	0	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**2,475**	**2,656**	**2,839**	**+364**

Outyears for Capital Equipment

($K)

	FY 2025 Estimate	FY 2026 Estimate	FY 2027 Estimate	FY 2028 Estimate	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	2,971	3,033	3,097	3,162	0
Mobile Guardian Transporter	0	0	0	8,500	433,500
Replacement Aircraft (Lifecycle Replacement 737)	0	0	45,000	0	0
Total, Capital Equipment (including MIE)	**2,971**	**3,033**	**48,097**	**11,662**	**N/A**

Defense Nuclear Security

Overview

The Office of Defense Nuclear Security (DNS) leads, develops, and implements the National Nuclear Security Administration's (NNSA) security program to enable its nuclear security enterprise (NSE) missions. DNS provides protection for NNSA personnel, facilities, nuclear weapons, and materials from a full spectrum of threats, ranging from minor security incidents to acts of terrorism, at its national laboratories, production plants, processing facilities, and the Nevada National Security Site (NNSS). In addition, DNS provides nuclear security expertise for a broad set of evolving national security needs, in line with its core mission, such as those in defense nuclear nonproliferation, homeland security, and intelligence. Employing more than 1,700 Protective Force (PF) officers, DNS secures more than 5,000 buildings and protects more than 57,000 personnel.

Defense Nuclear Security
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Defense Nuclear Security					
Operations and Maintenance					
Protective Forces	*451,912*	*460,937*	*527,566*	*+66,629*	*+14.5%*
Physical Security Systems	*125,934*	*168,039*	*196,167*	*+28,128*	*+16.7%*
Information Security	*56,293*	*61,239*	*68,960*	*+7,721*	*+12.6%*
Personnel Security	*52,806*	*52,342*	*58,976*	*+6,634*	*+12.7%*
Material Control and Accountability	*41,534*	*45,125*	*49,583*	*+4,458*	*+9.9%*
Security Program Operations and Planning	*92,611*	*80,490*	*87,504*	*+7,014*	*+8.7%*
Total, Operations and Maintenance	**821,090**	**868,172**	**988,756**	**+120,584**	**+13.9%**
Construction	**23,000**	**3,928**	**28,000**	**+24,072**	**+612.8%**
Total, Defense Nuclear Security	**844,090**	**872,100**	**1,016,756**	**+144,656**	**+16.6%**

Defense Nuclear Security
Outyear Funding

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Defense Nuclear Security				
Operations and Maintenance				
Protective Forces	*555,380*	*563,236*	*609,404*	*626,893*
Physical Security Systems	*189,741*	*180,446*	*200,067*	*200,695*
Information Security	*70,059*	*69,582*	*72,715*	*74,262*
Personnel Security	*60,058*	*60,248*	*63,966*	*65,074*
Material Control and Accountability	*49,406*	*49,787*	*53,256*	*54,213*
Security Program Operations and Planning	*95,825*	*102,146*	*105,042*	*106,748*
Total, Operations and Maintenance	**1,020,469**	**1,025,445**	**1,104,450**	**1,127,885**
Total, Defense Nuclear Security	**1,020,469**	**1,025,445**	**1,104,450**	**1,127,885**

Defense Nuclear Security
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Defense Nuclear Security	
Operations and Maintenance: The increase is based on additional security requirements associated with continued mission growth across the NNSA NSE, including plutonium pit production and Kansas City expansion efforts, and preparation for operation of the Uranium Processing Facility. The increase also supports the transfer of all Safeguards and Security (S&S) scope to the Management and Operating (M&O) Contractor Partner at the NNSS. In addition, funding supports FY 2024 Core Security requirements, as well as initiatives for the Physical Security Center of Excellence (PSCOE) and the Center for Security Technology, Analysis, Response, and Testing (CSTART).	**+120,584**
Construction: This increase provides funding for the West End Protected Area Reduction (WEPAR) project above the Critical Decision 2/3 (CD-2/3) Total Project Cost (TPC), which is needed to address delays in projects outside WEPAR scope, as well as contractor performance issues within the WEPAR project.	**+24,072**
Total, Defense Nuclear Security	**+144,656**

Defense Nuclear Security
Budget Request Highlights and Future Milestones

Highlights of the Fiscal Year 2024 Budget Request

The FY 2024 Budget Request of $1,016,756,000 reflects an increase of $144,656,000, or 16.6% above the FY 2023 Enacted level for DNS. The Budget Request includes funding to support key security program areas, across all S&S functional areas, required to support implementation of a risk-based, layered protection strategy at the sites. The Budget Request supports increased security needs resulting from known mission growth across the NSE, including pit production at Los Alamos National Laboratory (LANL) Kansas City expansion efforts, and UPF. The Request supports the transfer of all S&S scope to the M&O Contractor Partner at NNSS. In addition, the request continues to support the initiative to replace the aging Argus system with a modern security system, Caerus, and supports continuous improvement initiatives through PSCOE and CSTART activities. This Request also includes funding for continued efforts to recapitalize security infrastructure through Security Infrastructure Revitalization Program (SIRP) projects, addressing critical security systems and related security infrastructure and equipment refresh needs, as well as funding to support the WEPAR project.

FY 2025 – FY 2028 Key Milestones

Physical Security Systems

- Sustain counter uncrewed aircraft system (CUAS) operation at sites possessing Category 0/I quantities of special nuclear material (SNM).
- Complete planned SIRP projects, which aligns with NNSA's priority to recapitalize security infrastructure.
- Complete Caerus core deployments and continue transition of field equipment.

Construction

- Complete WEPAR project at Y-12 National Security Complex (Y-12).

FY 2022 Accomplishments

- Successfully implemented Trusted Workforce 1.5 for the Department of Energy (DOE). This included submitting over 30,000 fingerprint requests and enrolling over 90% of DOE's clearance holders into the Report of Arrest and Prosecution Back system, which supports near real-time evaluation of clearance holders.
- Initiated efforts to streamline security approvals for medically necessary personal electronic devices, which need to be introduced into specific secure areas.
- Achieved Initial Operating Capability for CUAS platforms installed at NNSS and the Pantex Plant.
- Reenergized collaboration activities between DNS and the Office of Nuclear Matters within the Department of Defense's (DOD's) Office of the Under Secretary of Defense for Acquisition and Sustainment. This effort focuses on opportunities to identify and implement improvements in how the two agencies harmonize their respective nuclear security programs, including threat assessments, technology development, policy, and other areas of mutual benefit.
- Achieved Full Operating Capability for Portable Intrusion Detection System (PIDS) units. PIDS is a rapidly deployable detection system (compensatory measure), developed in partnership with DOD.
- Broke ground on the Quadrant 1 Perimeter Intrusion Detection and Assessment System (PIDAS) refresh and completed the Post 8 Booth Replacement SIRP projects at Y-12.
- Developed, tested, and implemented Local Area Nuclear Material Accountability System (LANMAS) software enhancements at all user sites.
- Granted over 6,000 new security clearances in support of mission growth across the NNSA NSE.
- Co-led the Enduring Organizational Improvement Initiative for the Governance and Management: Risk Management sub-group. The team was recognized by NNSA senior leadership for their efforts to identify safety and security requirements that could be retired permanently or modified to improve efficiency, without increasing risk.

Defense Nuclear Security
Operations and Maintenance

Description
DNS Operations and Maintenance integrates personnel, equipment, and procedures to protect physical assets and resources against theft, sabotage, diversion, or other criminal acts. Each NNSA contractor partner has an approved Site Security Plan (SSP) detailing protection measures and resources needed to protect site security interests.

Protective Forces include duties, specialized training, performance testing, facilities, equipment, weapons/firearms, ammunition, vehicles, and other expenses. These forces are each site's primary frontline protection and consist of armed, uniformed officers. PF officers are an integral part of a site's security posture and are trained in tactics and techniques necessary to protect NNSA sites.

Physical Security Systems include highest priority SIRP projects, CUAS, intrusion detection and assessment systems, performance testing and certification/recertification, access control systems, barrier and delay mechanisms, canine explosive detection programs, and tactical systems. Many of the systems in use are well beyond their designed lifecycles and require increased maintenance and testing. Additional investments in critical security systems and infrastructure upgrade projects are necessary to sustain these systems. This includes PSCOE at Sandia National Laboratories, New Mexico, the centrally managed Argus program, and the effort to replace the aging centrally managed Argus system with Caerus, a modern security system at sites with Category I quantities of SNM.

Table 1 shows the plans for the SIRP projects to be executed in FYs 2024–2028. Other than PIDAS vehicle barrier upgrades, SIRP projects do not qualify as minor construction. Rather, SIRP projects include sensor, camera, lighting, and communication refreshes, and smaller capital equipment projects. This requirement is driven by the urgent necessity to repair systems with the highest risk of failure.

Table 1

Planned FY 2024-2028 SIRP Project Allocations by Site (Dollars in Millions)		
Site	**Project Name**	**FY 2024 Allocation ($M)**
NNSS	Device Assembly Facility: Design/Implementation for Protected Area revitalization work, includes PIDAS and sensor revitalization	10.24
Pantex	Zone 12 East PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	14.94
Pantex	Zone 12 South PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	22.20
Total, FY 2024		**$47.38**
Site	**Project Name**	**FY 2025 Allocation ($M)**
NNSS	Device Assembly Facility: Design/Implementation for Protected Area revitalization work, includes PIDAS and sensor revitalization	17.46
Pantex	Zone 12 South PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	6.00
Pantex	Zone 12 West PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	22.2
Total, FY 2025		**$45.66**

Planned FY 2024-2028 SIRP Project Allocations by Site (Dollars in Millions)		
Site	**Project Name**	**FY 2026 Allocation ($M)**
NNSS	Device Assembly Facility: Continued implementation for Protected Area revitalization work, includes PIDAS and sensor revitalization	25.72
	Device Assembly Facility Vehicle Barrier	8.4
Pantex	Zone 4 Design/Implementation PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	4.0
Total, FY 2026		**$38.12**
Site	**Project Name**	**FY 2027 Allocation ($M)**
NNSS	Device Assembly Facility: Continued implementation for Protected Area revitalization work, includes PIDAS and sensor revitalization	33.9
PTX	Zone 4 South PIDAS: Design and Implementation: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	8.0
Y-12	Material Access Area Booth Replacements	7.0
Total, FY 2027		**$48.9**
Site	**Project Name**	**FY 2028 Allocation ($M)**
Pantex	Zone 4 South PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	20.18
	Zone 4 Vehicle Barrier	11.73
	Zone 4 West PIDAS: Sensor revitalization, camera replacement, and camera tower replacement (includes power, fiber, network, sensors, and fences)	13.09
Total, FY 2028		**$45.0**

Information Security provides classification guidance, technical surveillance countermeasures, operations security, and classified matter protection and control.

Personnel Security includes access authorizations, badging, the Human Reliability Program, classified and unclassified visits, and foreign visits and assignments. It encompasses the administrative support for the site clearance process, including security clearance determinations at each site.

Material Control and Accountability controls and accounts for special and alternative nuclear materials through measurements, quality assurance, accounting, containment, surveillance, and physical inventory. This activity also includes the LANMAS software application, as well as training and operational support provided to DOE and NNSA sites and facilities.

Security Program Operations and Planning includes development of budgets, responses to audits and information requests, SSPs, vulnerability/risk assessments, and performance testing and assurance activities. Also, it includes security incident and reporting management, security surveys and self-assessments, activities related to deviation requests, and control of security technology transfer activities. Security Program Operations and Planning also supports facility clearance processing and Foreign Ownership, Control, or Influence determinations for security contracts.

Operations and Maintenance

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Operations and Maintenance $868,172,000	**Operations and Maintenance $988,756,000**	**Operations and Maintenance +$120,584,000**
Protective Forces $460,937,000	**Protective Forces $527,566,000**	**Protective Forces +$66,629,000**
• Maintains PFs to meet protection requirements based on approved vulnerability and risk assessments. • Supports refined FY 2023 UPF security requirements. • Supports FY 2023 LANL Pit Production security requirements.	• Maintains PFs to meet protection requirements based on approved vulnerability and risk assessments. • Supports FY 2024 mission growth, including support for Kansas City, UPF, and LANL Pit Production security requirements.	• Includes increases associated with mission growth across NNSA's NSE, including support for pit production, Kansas City expansion, and UPF preparation efforts. • Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements.
Physical Security Systems $168,039,000	**Physical Security Systems $196,167,000**	**Physical Security Systems +$28,128,000**
• Funds preventive and corrective maintenance for physical security systems and infrastructure at NNSA sites and provides protection against threats. • Supports highest priority SIRP projects. • Includes funding for highest priority continuous improvement initiatives through PSCOE. • Supports Caerus. • Sustains CUAS operation at sites possessing Category 0/I quantities of SNM. • Supports refined FY 2023 UPF security requirements. • Supports FY 2023 LANL Pit Production security requirements.	• Funds preventive and corrective maintenance for physical security systems and infrastructure at NNSA sites and provides protection against threats. • Supports planned SIRP projects. • Includes funding for continuous improvement initiatives through PSCOE. • Supports the completion of Caerus development and initiates efforts to deploy across the NSE. • Sustains CUAS operation at sites possessing Category 0/I quantities of SNM and supports next generation technology investments. • Supports FY 2024 mission growth, including support for Kansas City, UPF, and LANL Pit Production security requirements.	• Reflects increased support for SIRP projects. • Includes increases associated with mission growth across NNSA's NSE, including support for pit production, Kansas City expansion, and UPF preparation efforts. • Supports CUAS next generation technology investments. • Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements.
Information Security $61,239,000	**Information Security $68,960,000**	**Information Security +$7,721,000**
• Maintains an information protection program and sustains implementation of DOE Order 470.6, *Technical Security Program.*	• Maintains an information protection program and sustains implementation of DOE Order 470.6, *Technical Security Program.*	• Includes increases associated with mission growth across NNSA's NSE, including support for pit production efforts and Kansas City expansion efforts.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Supports FY 2023 LANL Pit Production security requirements.	• Supports FY 2024 mission growth; including support for Kansas City and LANL Pit Production security requirements.	• Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements.
Personnel Security $52,342,000	**Personnel Security $58,976,000**	**Personnel Security +$6,634,000**
• Maintains a personnel security program while implementing efficiencies in a risk-based manner. • Supports FY 2023 LANL Pit Production security requirements.	• Maintains a personnel security program while implementing efficiencies in a risk-based manner. • Supports FY 2024 mission growth, including support for Kansas City and LANL Pit Production security requirements. • Maintains and sustains the Clearance Action Tracking System.	• Includes increases associated with mission growth across NNSA's NSE, including support for pit production efforts and Kansas City expansion efforts. • Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements.
Material Control and Accountability $45,125,000	**Material Control and Accountability $49,583,000**	**Material Control and Accountability +$4,458,000**
• Provides for control and accountability of special and alternative nuclear materials and maintains a level of effort critical to NNSA's layered protection program. • Sustains LANMAS software. • Supports refined FY 2023 UPF security requirements. • Supports FY 2023 LANL Pit Production security requirements.	• Provides for control and accountability of special and alternative nuclear materials and maintains a level of effort critical to NNSA's layered protection program. • Sustains LANMAS software. • Supports FY 2024 mission growth, including support for UPF and LANL Pit Production security requirements.	• Includes increases associated with mission growth across NNSA's NSE, including support for pit production and UPF preparation efforts. • Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements.
Security Program Operations and Planning $80,490,000	**Security Program Operations and Planning $87,504,000**	**Security Program Operations and Planning +$7,014,000**
• Maintains SSPs, risk/vulnerability assessment capabilities, budget development, management of site programs for incidents of security concern, and security awareness programs. • Includes funding for highest priority continuous improvement initiatives through CSTART. • Supports refined FY 2023 UPF security requirements. • Supports FY 2023 LANL Pit Production security requirements.	• Maintains SSPs, risk/vulnerability assessment capabilities, budget development, management of site programs for incidents of security concern, and security awareness programs. • Supports FY 2024 mission growth, including support for Kansas City, UPF, and LANL Pit Production security requirements. • Includes funding for continuous improvement initiatives through CSTART.	• Includes increases associated with mission growth across NNSA's NSE, including support for pit production, Kansas City expansion, and UPF preparation efforts. • Reflects escalation, as well as support for increased resource needs to sustain Core Security requirements. • Reflects increased support for CSTART initiatives.

Defense Nuclear Security
Construction

Description

DNS construction supports critical physical security infrastructure within the NNSA NSE. The WEPAR project will install a new PIDAS section to reduce the Y-12 Protected Area by approximately 50% and integrate with UPF. CD-2/3, Approve Performance Baseline and Start of Construction, was approved in January 2021. Construction began in April 2021, continuing into FY 2024. CD-4 completion is scheduled for FY 2025. The most current Estimate at Completion (EAC) indicates the project will exceed the approved baseline for both total project cost and CD-4. This estimate still needs to go through the federal review and baseline change approval process. A Baseline Change Proposal to incorporate the re-plan will be processed in FY 2023 after validation by an Independent Cost Review and External Independent Review.

Construction

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Construction $3,928,000	**Construction $28,000,000**	**Construction +$24,072,000**
• Supports ongoing construction efforts for the WEPAR project.	• Continues to support WEPAR construction efforts.	• Includes increased funding above the baselined WEPAR TPC, which is needed to address issues experienced with delays in projects outside WEPAR scope, as well as contractor performance issues.

Defense Nuclear Security
Capital Equipment

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	3,100	3,326	3,556	+230
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**3,100**	**3,326**	**3,556**	**+230**

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	3,721	3,799	3,879	3,960	N/A
Total, Capital Equipment (including MIE)	**3,721**	**3,799**	**3,879**	**3,960**	**N/A**

Defense Nuclear Security
Construction Projects Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
17-D-710, West End Protected Area Reduction (WEPAR), Y-12						
Total Estimated Cost (TEC)	162,028	107,100	23,000	3,928	28,000	+24,072
Other Project Cost (OPC)	9,822	6,100	0	3,722	0	-3,722
Total Project Cost (TPC), 17-D-710, WEPAR, Y-12	**171,850**	**113,200**	**23,000**	**7,650**	**28,000**	**+20,350**
Total All Construction Projects						
Total Estimated Cost (TEC)	162,028	107,100	23,000	3,928	28,000	+24,072
Other Project Cost (OPC)	9,822	6,100	0	3,722	0	-3,722
TPC All Construction Projects	**171,850**	**113,200**	**23,000**	**7,650**	**28,000**	**+20,350**

Outyears for Construction Project Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
17-D-710, West End Protected Area Reduction (WEPAR), Y-12					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	0	0	0	0	0
Total Project Cost (TPC), 17-D-710, WEPAR, Y-12	**0**	**0**	**0**	**0**	**0**
Total All Construction Projects					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	0	0	0	0	0
TPC All Construction Projects	**0**	**0**	**0**	**0**	**0**

Defense Nuclear Security
Other Information

Full Cost Recovery Estimates

The Budget Request provides direct funding for mission-based DNS programs. Strategic Partnership Projects (SPPs) will continue to fund an allocable share of the base program through full cost recovery. Extraordinary security requirements for SPPs, such as dedicated security for special projects or exercises on an extended basis, will be a direct charge to those customers.

($K)

	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Site				
Kansas City National Security Campus	1,738	1,896	+158	9.1%
Lawrence Livermore National Laboratory	10,820	11,047	+227	2.1%
Los Alamos National Laboratory	6,000	6,171	+171	2.9%
NNSA Production Office	2,479	3,641	+1,162	46.9%
Nevada National Security Site	800	1,500	+700	87.5%
Sandia National Laboratories	24,475	24,105	-370	-1.5%
Total	**46,312**	**48,360**	**+2,048**	**4.4%**

17-D-710 West End Protected Area Reduction
Y-12 National Security Complex, Oak Ridge, Tennessee
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History:

Summary:

The West End Protected Area Reduction (WEPAR) project is responsible for installation of a new Perimeter Intrusion Detection and Assessment System (PIDAS) section to reduce the Y-12 National Security Complex Protected Area (PA) by approximately 50%. The project consists of three main parts: PIDAS (H Road and Entry Control Facility), West End Security Transition (WEST), and Legacy PIDAS Demolition.

The Fiscal Year (FY) 2024 Request for the WEPAR Project is $28,000,000 for construction of the new PIDAS, engineering and performance testing, government acceptance testing, transition to operations, and Legacy PIDAS Demolition. The current Critical Decision (CD)-2/3 was approved on January 11, 2021 by the Associate Administrator for Defense Nuclear Security with a Total Project Cost (TPC) of $159,850,000 and a CD-4 approval of July 2025. A Federal Project Director (FPD) has been assigned to this project.

This project was initiated in FY 2018. This Construction Project Data Sheet (CPDS) is an update of the FY 2023 CPDS and does not include a new start. The CD-2/3 WEPAR TPC was based on final design and construction bids. Project cost and schedule contingency is based on risks associated with interfaces with other Y-12 construction projects and concurrent Y-12 operations. The TPC was validated with an Independent Cost Estimate (ICE) completed prior to CD-2/3.

Significant Changes:

Based on information under review by the Department, the WEPAR project will exceed both the CD-2/3 schedule and TPC. The FY 2024 Request is $28 million, bringing the estimate TPC to $171,850,000. The estimated TPC will likely change, pending the External Independent Review and Independent Cost Review currently scheduled for the third quarter FY 2023, and in advance of submitting a baseline change request to the Project Management Executive for approval. Once the rebaseline is approved by the Project Management Executive, the funding profile will be aligned with the new baseline.

The increased cost and delays are attributed to both external and internal factors such as a defaulted subcontractor, challenging site interfaces, and supply chain issues. The site interface issues include, but are not limited to, projects that are several months behind schedule and either turned over late or have yet to turn over their construction footprint to the WEPAR project, which, prevents construction in these areas. Project delays are also preventing the tie in and testing of WEPAR systems, specifically the West End Security Transition scope. In addition, planning and coordination of outages necessary to support utility scope were underestimated at CD-2/3 as compared to actuals.

DOE/NNSA continues to assess the potential impacts on TPC and the CD-4 date of market conditions (e.g., tight labor market, supply chain delays, and inflation) and internal challenges (e.g., integration with aging infrastructure, site utility limitations, synchronization of multiple site projects and interfacing work fronts). Construction projects across the nation are experiencing continuing impacts and the Nuclear Security Enterprise is especially susceptible to market conditions due to the skills and clearances required for designers and craft personnel and the small, domestic, specialty suppliers often required. As noted above, WEPAR has been severely affected by supporting (off project) work that has not completed on time and is still experiencing delays, unforeseen contamination (mercury), discovering significantly more communication lines in the project footprint than expected, the default of the electrical subcontractor (a key component of most facets of work), and the continuing difficulty to secure a replacement electrical subcontractor. Electrical critical path work continues on a letter contract as a new agreement is negotiated after a proposal three times the independent estimate was received. Based on these factors, the project cost may increase by 25% to 50% (new TPC of $210 million to $240 million) and the schedule could extend by 1 to 2 years. NNSA remains actively engaged to minimize further cost increases and schedule delays.

Critical Milestone History

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2021	09/06/2017	07/25/2018	12/13/2018	1Q FY 2021	2Q FY 2020	1Q FY 2021	N/A	3Q FY 2024
FY 2022	09/06/2017	07/25/2018	12/13/2018	01/11/2021	01/11/2021	01/11/2021	N/A	07/31/2025
FY 2023	09/06/2017	07/25/2018	12/13/2018	01/11/2021	01/11/2021	01/11/2021	N/A	07/31/2025
FY 2024	09/06/2017	07/25/2018	12/13/2018	01/11/2021	01/11/2021	01/11/2021	N/A	07/31/2025[a]

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3 – Approve Start of Construction
Deactivation and Decommissioning (D&D) Complete – N/A
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3B
FY 2021	12/19/2020	N/A	N/A

CD-3A – Approve Long-Lead Procurements, Original Scope
CD-3B – Approve Long-Lead Procurements, Revised Scope

Project Cost History

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2021	19,540	123,270	142,810	17,040	N/A	17,040	159,850
FY 2022	12,710	137,318	150,028	9,822	N/A	9,822	159,850
FY 2023	12,710	137,318	150,028	9,822	N/A	9,822	143,850
FY 2024	12,710	149,318	162,028	9,822	N/A	9,822	171,850[b]

[a] NNSA has not yet estimated a revised CD-4 projection based on the forthcoming project re-plan.
[b] The FY 2024 Request funds the project above the approved baseline TPC. This is a preliminary figure. NNSA will process a Baseline Change Proposal to incorporate the re-plan after validation by an Independent Cost Review and External Independent Review.

2. Project Scope and Justification

Scope

The project will design and move the Y-12 National Security Complex western PIDAS boundary, design and construct a pedestrian and vehicle portal, secure facilities that fall outside of the newly established Protected Area (PA) and demolish legacy PIDAS structures. During the conceptual design phase, feasible options were evaluated to ensure the project scope was correctly sized to meet the site's critical mission needs. The WEPAR project will eliminate approximately 70 acres from the Y-12 PA. The new PIDAS leg will be approximately 1,750 linear feet located on the current H-road footprint and parallel to North First Street. This will provide a reduction in current PIDAS by approximately 8,000 linear feet; above-grade components of the existing/abandoned 8,000 linear feet will be demolished as part of the project. Scope also includes refurbishing legacy PIDAS south of the UPF, and converting four building areas to Limited Areas (LA).

Justification And Mission Need

The removal of 70 acres from the PA will allow DOE/NNSA to avoid ongoing security operation requirements that are instituted within a PA; decrease costs for legacy facility operation, maintenance, and demolition; and will reduce the cost of any new facility construction to support potential mission needs in the future. This project will allow the DOE Office of Environmental Management to disposition Buildings 9204-04 (Beta-4) and 9201-05 (Alpha-5) outside of the PA. Alpha-5 is NNSA's highest risk excess facility. D&D of Beta-4 outside of the PA will save an estimated $250 million.

The WEPAR project is being conducted in accordance with the project management requirements in DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. Project cost and schedule contingency is based on risks associated with other Y-12 construction projects interfaces and concurrent Y-12 operations. Funds appropriated under this data sheet are for construction and may be used for contracted support services to the Federal Program Manager and the FPD to conduct independent assessments of the planning and execution of this Project required by DOE O 413.3B and to conduct technical reviews of design and construction documents.

Key Performance Parameters (KPPs)

The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion.

Table 5: KPP

Performance Measure	Threshold	Objective
Provide a new PIDAS boundary	Detection and assessment capability as required by DOE O 473.3A	N/A
Provide a new entry control point	Control point will provide access control and entry/exit inspection as required by DOE O 473.3A	N/A
Install annunciator agnostic communications that is compatible with current system	Satisfactory completes Assessment, Verification, Cut Over (Testing compliant with DOE O 473.3A	N/A
Secure storage in Buildings 9720-25, 9720-33, 9811-1 and 9720-59	Buildings meet DOE O 473.3A requirements	N/A

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2017	2,500	2,500	0
FY 2018	10,210	10,210	0
FY 2019	0	0	3,462
FY 2020	0	0	7,305
FY 2021	0	0	1,943
Total Design	12,710	12,710	12,710
Construction			
FY 2017	0	0	0
FY 2018	43,390	43,390	0
FY 2019	0	0	0
FY 2020	25,000	25,000	0
FY 2021	26,000	26,000	18,611
FY 2022	23,000	23,000	39,269
FY 2023	3,928	3,928	44,000
FY 2024	28,000	28,000	44,000
FY 2025	0	0	3,438
FY 2026	0	0	0
Total Construction	149,318	149,318	149,318
Total Estimated Costs (TEC)			
FY 2017	2,500	2,500	0
FY 2018	53,600	53,600	0
FY 2019	0	0	3,462
FY 2020	25,000	25,000	7,305
FY 2021	26,000	26,000	20,554
FY 2022	23,000	23,000	39,269
FY 2023	3,928	3,928	44,000
FY 2024	28,000	28,000	44,000
FY 2025	0	0	3,438
FY 2026	0	0	0
Total TEC	162,028	162,028	162,028

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs			
FY 2017	6,100	6,100	0
FY 2018	0	0	1,743
FY 2019	0	0	915
FY 2020	0	0	814
FY 2021	0	0	276
FY 2022	0	0	547
FY 2023	3,722	3,722	2,235
FY 2024	0	0	1,759
FY 2025	0	0	800
FY 2026	0	0	733
Total OPC	9,822	9,822	9,822
Total Project Costs (TPC)			
FY 2017	8,600	8,600	0
FY 2018	53,600	53,600	1,743
FY 2019	0	0	4,377
FY 2020	25,000	25,000	8,119
FY 2021	26,000	26,000	20,830
FY 2022	23,000	23,000	39,816
FY 2023	7,650	7,650	46,235
FY 2024	28,000	28,000	45,759
FY 2025	0	0	4,238
FY 2026	0	0	733
Grand Total	**171,850**	**171,850**	**171,850**

4. Details of Project Cost Estimate

($K)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	12,710	12,710	12,710
Contingency	0	0	0
Total, Design	12,710	12,710	12,710
Construction			
Site Work	30,000	29,044	22,781
Equipment	8,000	7,879	7,879
Construction	98,838	77,962	71,698
D&D	2,500	2,433	2,433
Contingency	9,980	4,000	32,527
Total, Construction	149,318	121,318	137,318
Total Estimated Cost	162,028	134,028	150,028
Contingency, TEC	9,980	4,000	32,527
Other Project Cost (OPC)			
OPC except D&D			
Conceptual Planning	2,189	2,189	2,189
Conceptual Design	532	532	532
Other OPC Costs	5,681	5,681	5,681
Contingency	1,420	1,420	1,420
Total, OPC	9,822	9,822	9,822
Contingency, OPC	1,420	1,420	1,420
Total Project Cost	171,850	143,850	159,850
Total Contingency (TEC+OPC)	11,400[a]	5,420	33,947

.

5. **Schedule of Appropriations Requests**

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
FY 2021	TEC	92,100	41,900	8,810	0	0	0	0	0	142,810
	OPC	9,100	3,500	3,590	850	0	0	0	0	17,040
	TPC	101,200	45,400	12,400	850	0	0	0	0	159,850
FY 2022	TEC	107,100	23,000	19,928	0	0	0	0	0	150,028
	OPC	6,100	0	3,722	0	0	0	0	0	9,822
	TPC	113,200	23,000	23,650	0	0	0	0	0	159,850
FY 2023	TEC	107,100	23,000	3,928	0	0	0	0	0	134,028
	OPC	6,100	0	3,722	0	0	0	0	0	9,822
	TPC	113,200	23,000	7,650	0	0	0	0	0	143,850
FY 2024	TEC	107,100	23,000	3,928	28,000	0	0	0	0	162,028
	OPC	6,100	0	3,722	0	0	0	0	0	9,822
	TPC	113,200	23,000	7,650	28,000	0	0	0	0	171,850

6. **Related Operations and Maintenance Funding Requirements**

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	4Q FY 2025
Expected Useful Life (number of years)	25
Expected Future Start of D&D of this capital asset (fiscal quarter)	4Q FY 2050

($K)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	2,100	2,100	63,900	63,900

7. D&D Information

The new area being constructed in this project is replacing existing facilities and includes an Entry Control Facility (~5,000 ft^2). The costs of D&D of the facilities being replaced are included in the costs of this construction project. The project scope includes the removal and disposition of approximately 8,000 linear feet of legacy PIDAS and Post 33 (~1,000 ft^2) once WEPAR is certified. Completion of this project will allow DOE EM to D&D Buildings 9204-04 (Beta-4) and 9201-05 (Alpha-5), which total almost 1 million ft^2, outside of the PA.

	Square Feet (rounded to nearest 1,000)
New area being constructed by this project at Y-12	5,000
Area of D&D in this project at Y-12	1,000
Area at Y-12 to be transferred, sold, and/or D&D outside the project, including area previously "banked"	0
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project, including area previously "banked"	0
Total area eliminated	0

8. Acquisition Approach

The NNSA FPD and the Integrated Project Team are responsible for the execution of the project. The Management and Operating (M&O) contractor for Y-12 is the designated design authority and overall project manager, while the Sandia National Laboratories M&O contractor's Physical Security Center of Excellence (PSCOE) is the design agent and construction manager. The NNSA Office of Defense Nuclear Security is responsible for defining program requirements, selecting the preferred alternatives, and for any project scope changes. The NNSA Office of Infrastructure (NA-90) is responsible for providing support for alternative studies, and serves as the lead NNSA office during design, construction, and commissioning of the project. PSCOE will play a vital role in the integration of the security features. Significant coordination with the Y-12 M&O contractor will be required for physical and technical tie-ins to current systems. As part of acquisition planning, NNSA will manage the M&O performance through the DOE/NNSA Strategic Performance Evaluation and Measurement Plan (PEMP), which sets forth the criteria by which NNSA will evaluate M&O performance and upon which NNSA shall determine the amount of award fee earned.

Information Technology and Cybersecurity

Overview

The NNSA Office of the Associate Administrator for Information Management and Chief Information Officer (OCIO) is responsible for information management, information technology (IT), and cybersecurity for NNSA. The NNSA IT and Cybersecurity Program focuses on the development of integrated IT initiatives that provide an effective technology infrastructure to support the Nuclear Security Enterprise (NSE) shared services. These initiatives will fundamentally redesign the NNSA IT and cybersecurity environments to provide a more secure and agile set of capabilities including unified communication, agile cloud infrastructure, and next-generation collaboration services across the NSE. The approach will provide commodity services that can be used in the future with NNSA Management and Operating (M&O) partners to improve the security of sensitive NNSA data and host shared services. Additionally, the NNSA IT and Cybersecurity Program will create a plan to explore IT application capabilities, operational technology, machine learning, and artificial intelligence to implement tools and capabilities to secure future NNSA operations.

To effectively achieve its mission, the NNSA OCIO has implemented an organizational structure that supports its functions under three organizations: the Office of Information Technology, the Office of Cybersecurity, and the Office of Mission Integration. NNSA OCIO also collaborates and coordinates with the Department of Energy's (DOE) Office of the Chief Information Officer (DOE OCIO) on the development and deployment of IT and cybersecurity solutions to protect DOE information and information assets.

Highlights of the Fiscal Year (FY) 2024 Request

The FY 2024 Budget Request for the Information Technology and Cybersecurity Program is $578.4 million to support the Department's proactive and strategic approach to protect and harden NNSA's IT infrastructure against cyber threats. The FY 2024 Budget Request enhances cybersecurity capabilities, cloud-based technologies, and IT modernization and infrastructure. The Budget Request strengthens the role of the NNSA OCIO in enhancing cybersecurity capabilities and activities for identifying, protecting, detecting, responding, and recovering against cyber threats. The Request supports NNSA's enterprise-wide investments in IT and cyber to support NNSA's mission.

The FY 2024 Budget Request provides critical cybersecurity and IT resources to enhance security and address the requirements of Executive Order (EO) 14028, *Improving the Nation's Cybersecurity*, the Administration's shift towards a Zero Trust Architecture (ZTA), and Office of Management and Budget (OMB) Memoranda. These memos include OMB M-22-01, *Improving Detection of Cybersecurity Vulnerabilities and Incidents on Federal Government Systems through Endpoint Detection and Response*; M-21-31*, Improving the Federal Government's Investigative and Remediation Capabilities Related to Cybersecurity Incidents*; M-22-09, *Moving the U.S. Government Toward Zero Trust Cybersecurity Principles;* M-22-18, *Enhancing the Security of the Software Supply Chain through Secure Software Development Practices*, and National Security Memorandum/NSM-8 on Improving the Cybersecurity of National Security, Department of Defense, and Intelligence Community Systems. Additionally, NNSA conducted an independent third-party assessment of the cyber program which provided a roadmap of recommendations and investments that will provide the most impact as NNSA continues to improve the cyber and IT programs.

With the increase in cyber requirements, NNSA is investing in people and buying down risk in FY 2023. Such efforts will build NNSA's capacity to meet today's IT and cyber challenges, gain operational efficiencies, and achieve enterprise-wide compliance for IT infrastructure in FY 2024. Procuring efforts for capabilities and applications that will be implemented at laboratories, plants, and sites will create this enterprise-wide investment approach. This action meets NNSA's cybersecurity goals in creating a unified approach to cyber spending and establishing stronger protections across the enterprise.

Finally, achieving and maintaining a secure NNSA information environment for the enterprise requires an approach that combines defense-in-depth, defense-in-breadth, and zero-trust principles with essential guiding tenets that align the IT and Cybersecurity Program with NNSA cultural and business drivers. The guiding tenets that support the NNSA OCIO are risk management, agility, trust, and partnership. These tenets align people, processes, and technology while directly contributing to the success of the IT and Cybersecurity Program.

Information Technology and Cybersecurity
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted[a]	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Information Technology and Cybersecurity					
Cybersecurity					
Site Infrastructure	*115,178*	*110,292*	*137,309*	*+27,017*	*+24.5%*
Enterprise Operations	*182,065*	*105,159*	*178,593*	*+73,434*	*+69.8%*
Subtotal, Cybersecurity	**297,243**	**215,451**	**315,902**	**+100,451**	**+46.6%**
Information Technology	*109,287*	*230,203*	*262,477*	*+32,274*	*+14.0%*
Total, Information Technology and Cybersecurity	**406,530**	**445,654**	**578,379**	**+132,725**	**+29.8%**

Information Technology and Cybersecurity
Outyear Funding

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Information Technology and Cybersecurity				
Cybersecurity				
Site Infrastructure	*142,822*	*156,177*	*158,174*	*164,569*
Enterprise Operations	*260,520*	*286,096*	*303,889*	*291,233*
Subtotal, Cybersecurity	**403,342**	**442,273**	**462,063**	**455,802**
Information Technology	*261,032*	*284,288*	*301,009*	*302,862*
Total, Information Technology and Cybersecurity	**664,374**	**726,561**	**763,072**	**758,664**

[a] Reflects recategorization of subprogram activities.

Information Technology and Cybersecurity
Explanation of Major Changes
($K)

	FY 2024 Requests vs FY 2023 Enacted ($)
Information Technology and Cybersecurity	
Cybersecurity: The funding increase reflects investments in ZTA, Endpoint Detection and Response (EDR), operational technology, and other cybersecurity tools and services through the Enterprise Operations subprogram and supports labor rate increases and workforce growth at the laboratories, plants, and sites to address the significant increase in technology use as the NNSA mission has grown through the Site Infrastructure subprogram.	**+100,451**
Information Technology: The funding increase supports IT programs such as the continued modernization of IT infrastructure, network architecture, and classified IT systems, including the Emergency Communications Network (ECN). The increase includes the cost associated with classified infrastructure and capabilities, implementation of cloud infrastructure, and unclassified IT services. Reflecting NNSA OCIO priorities, such costs will enhance unclassified and classified collaboration tools and network services as well as provide redundancy and improve performance for mission partners globally.	**+32,274**
Total, Information Technology and Cybersecurity	**+132,725**

Cybersecurity is not only about mitigating risk, but it is also about keeping up with ever-changing threats and vulnerabilities. NNSA will reduce threats by minimizing attack surfaces and finding innovative ways to support the mission goals and objectives of the NSE. To ensure mission success, NNSA IT and Cybersecurity Program is committed to maintaining and modernizing the IT and cybersecurity infrastructure that supports mission activities within the weapons program classified information processing environment, nuclear material transport, weapon modernization, and incident response. NNSA relies on the OCIO's ability to successfully detect, deny, disrupt, and degrade malicious events and activities on networks and systems.

The FY 2024 Budget Request of $315.9 million for NNSA's Cybersecurity Program promotes a strong cybersecurity posture across the NSE. This includes supporting the following core cybersecurity activities:

- Assess cybersecurity threats to NNSA information assets and prioritize risk management activities to increase information assurance.
- Reduce the vulnerabilities of NNSA information systems to ensure that NNSA data is protected.
- Counter malicious actors and nation states through detection, prevention, and disruption of suspicious activity using continuous monitoring activities and innovative tools.
- Respond quickly and effectively to cybersecurity incidents through coordinated enterprise-wide response efforts.
- Share NNSA information with mission partners and stakeholders safely and securely.
- Strengthen the resiliency of the NSE by improving NNSA's ability to identify and mitigate cybersecurity threats and supply chain risks with minimal impact to mission.

Description

The Cybersecurity Program is organized into two subprograms: Site Infrastructure and Enterprise Operations.

The Site Infrastructure subprogram supports the cybersecurity operations and activities at NNSA M&O and Federal sites. The subprogram is built around a defense-in-depth approach for achieving cybersecurity in a highly networked environment. NNSA OCIO continues to transition from a defense-in-depth cybersecurity posture towards ZTA in accordance with EO 14028. Funds provided under the Site Infrastructure subprogram sustain local cybersecurity operations at the laboratories, plants, and sites in support of NNSA mission priorities and in accordance with DOE and NNSA policy. Recent efforts have included implementation of the NNSA Application Modernization Strategy which is critical for mission applications required for weapons design. The strategy ensures applications introduced into this environment undergo rigorous supply chain risk management processes.

The Enterprise Operations subprogram provides essential cybersecurity support and operations to the NNSA enterprise through the Information Assurance Response Center (IARC), including audits, assessments, policy, management, planning, and training. The IARC is a security operations center (SOC) that provides 24/7/365 cybersecurity services to NNSA and DOE networking enclaves. The IARC also provides near real-time network defense and incident response services that protect these classified and unclassified enclaves and information from attacks. As a participant with DOE's Integrated Joint Cybersecurity Coordination Center (iJC3) Program, the IARC also supports enterprise-level cyber threat management and situational awareness for DOE. The Enterprise Operations subprogram is responsible for developing and advancing policies and initiatives that support short and long-term solutions to specific cybersecurity requirements at NNSA sites and headquarters locations. Finally, the Enterprise Operations subprogram focuses on emerging technologies and leveraging existing technology resources to create a more secure environment.

The protection of the core information assets, networks, applications, and systems includes an enterprise-level identity model, strong (multifactor) authentication, and a centralized monitoring and analysis capability. These components provide a secure infrastructure system required to sustain the stockpile stewardship program. The protected networks provide a broad base of security and network services that include application integration, authentication services, directory services, enterprise data resource management, the IARC SOC and network operations center (NOC), identity and access management (IAM), public key infrastructure (PKI), and security monitoring and intrusion detection.

Highlights of the FY 2024 Budget Request

- Implement the Administration's cybersecurity priorities and NSM-8 requirements. This includes continuing to transition from a defense-in-depth cybersecurity posture toward ZTA by investing in enabling technologies such as multifactor authentication (MFA) and other EO 14028 pillars.
- Address findings from the NNSA Independent Cyber Assessment Report including improving recruitment and retention of cybersecurity staff across NNSA, enhancing real-time monitoring capabilities, and expanding proven Center of Excellence (COE) offerings.
- Full scale implementation of EDR capabilities across all NNSA network infrastructure.
- Expand orchestration and automation of cybersecurity capabilities, leveraging investments in cybersecurity tools and capabilities such as EDR.
- Inventory, categorize, and triage NNSA's operational technology assets and prioritize risk mitigations.
- Continue to evolve unified communications capabilities to enhance information sharing between other government agencies (OGA) and NNSA.
- Finalize modernization efforts of Enterprise Secure Computing (ESC) environments by enhancing core services and collaborative capabilities, consolidating disparate network infrastructure, and beginning pilot and transition activities.
- Invest in operational technology tools and capabilities to continue to enhance NNSA's ability to detect, deny, and respond to anomalous activity in this area.
- Engage externally with OGAs, enhance partnerships, share lessons learned, and modernize the way NNSA executes its mission.
- Establish a Red and Blue Team cybersecurity capability within NNSA, partnering with OGAs and stakeholders, investing in tools and infrastructure, and beginning Red team engagement across NNSA.
- Expand NNSA's COE for Threat Intelligence to other DOE elements, providing tools and capabilities to rapidly build effective threat hunting teams across the Department.

FY 2025 – FY 2028 Key Milestones

- Implement Cloud based Enterprise Governance Risk and Compliance, enhancing the ability to analyze and share critical cybersecurity risk information and improving enterprise situational awareness.
- Invest in classified mobile solutions, improving critical capabilities for senior leaders to effectively communicate and collaborate.
- Begin the expansion of sensitive compartmented information facilities to support IT and cybersecurity activities.
- Augment cybersecurity resources for NNSA Field Offices to reduce backlog of information security requests and provide for consistent implementation of automatic authorization.
- Enhance NNSA's data sharing capabilities, developing a series of frameworks that focus on sharing data with OGA's and stakeholders in line with EO 14028.
- Further expand NNSA COE for Threat Intelligence to DOE elements, enhancing the Department's threat hunting capabilities.
- Establish additional COEs to improve and enhance cybersecurity operations throughout the enterprise in FY 2025.
- Reinforce security posture for highly classified information and enhance the capability to share information with the Department of Defense (DOD) by modernizing the network architecture as well as upgrading and enhancing security.
- Continue developing and implementing a cybersecurity framework for IT to include network-connected operational technologies and systems.

FY 2022 Accomplishments

- Executed a series of cybersecurity exercises that focused on reinforcing incident response processes and procedures as well as testing new cybersecurity capabilities for possible future investment.
- Successfully completed the fourth Cyber Security Service Provider assessment and audit.
- Completed several procurement actions, expanding enterprise capabilities around security logging, orchestration and automation, EDR, operational technology, and MFA.
- Completed implementation roadmaps in response to EO 14028 for ZTA, MFA, security logging, etc.
- Completed the replacement of the IARC Enterprise Security Event and Incident Management (SEIM) tool, enhancing continuous monitoring, threat detection, and rapid investigation and response.
- Completed the recapitalization of NNSA's deployed sensor platform, enhancing deployed monitoring capabilities.

Cybersecurity
Funding

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Cybersecurity $215,451,000	**Cybersecurity $315,902,000**	**Cybersecurity +$100,451,000**
Site Infrastructure $110,292,000	**Site Infrastructure $137,309,000**	**Site Infrastructure +$27,017,000**
• Continues cybersecurity operations of the NNSA sites. • Maintains core cybersecurity operations at NNSA laboratories, plants, and sites to ensure the protection of NSE information and information assets. • Enables the achievement of federal standards such as NIST and CNSS requirements; implementing the President's EO 14028; and, finally, DOE and NNSA policy, procedures, and guidance.	• Continues to maintain core cybersecurity operations at the laboratories, plants, and sites. • Enables the cybersecurity programs at the laboratories, plants, and sites to address mission growth, including related staffing concerns and other risks. • Supports implementation of EO 14028 and NSM-8 requirements by improving identity and access management along with further deployments of MFA as a basis for ZTA.	• The increase supports cybersecurity programs at laboratories, plants, and sites to keep pace with NNSA mission requirements, investing in workforce development and cybersecurity capability requirements.
Enterprise Operations $105,159,000	**Enterprise Operations $178,593,000**	**Enterprise Operations +$73,434,000**
• Supports cyber services including the labor, software, and hardware necessary to manage the Cybersecurity Program. The labor includes areas such as accreditation and the 24/7/365 security monitoring, as well as forensics and incident management and response. • Transitions to a managed service support contract model with discrete work scope for each task. The new approach enables NNSA to take advantage of new and emerging technologies while maximizing efficient use of resources. IT services have been delivered to NNSA through a build, own, and operate model supported by a	• Provides funding for the labor, software, and hardware necessary to manage the Cybersecurity Program. • Maintains a strong Cybersecurity Program by investing in critical networks, system improvements, and enterprise services, including operational technology. • Invests in ZTA enablers such as MFA/encryption-at-rest and -in-transit, EDR, and logging. • Expands collaboration with the laboratories, plants, and sites.	• The increase in funding reflects investment in cybersecurity tools and services provided to the enterprise to meet Federal cybersecurity standards.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
firm, fixed-price, small business contract. This model is unable to keep pace with the rapid innovation of IT and cybersecurity. • Supports enterprise efforts that leverage the research/Strategic Partnership Program (SPP) work on a site to bring a cyber function to the enterprise. The efforts are led by a primary site with interaction at each NNSA location. • Develops an architecture and commercial classified solution for classified wireless throughout the NSE. • Provides funding for tools procurement and licensing for locations without the appropriate security tools to meet Continuous Diagnostics and Mitigation (CDM) requirements. • Supports the cybersecurity requirements outlined within the EO 14028 that require compliance-based evaluation of cybersecurity.		

Information Technology and Cybersecurity
Information Technology

Description
NNSA OCIO directs the design, development, and maintenance of all aspects of NNSA computing and provides NNSA staff with the IT resources necessary to achieve mission goals and objectives. The IT Program supports the infrastructure and protection for both classified and unclassified computing networks, secure communications, applications, systems, and logical environments. It ensures electronic information and information assets are operating efficiently and effectively and are protected from unauthorized access and malicious acts that would adversely affect national and economic security. The IT Program provides enterprise-level classified computing infrastructure and unclassified applications services to NNSA Federal staff in support of the NNSA mission. The IT Program also leverages cloud-based services and solutions whenever possible to support infrastructure hosting and application development, operations, and maintenance.

IT classified computing enables DOE/NNSA laboratories and sites to communicate and share information regarding NNSA's mission. The program supports IT systems and networks and serves as the computer network defense service provider for the Secret Fabric for the Department.

- The NNSA Secret Network (NSN) supports the processing of Secret/National Security Information (NSI) and the interconnection with the DOD SIPRNET.
- ECN supports DOE/NNSA mission elements to provide continuous, effective, and secure network services (data-video-voice) for all DOE/NNSA response components and are reliably maintained at rest and throughout operational emergencies.
- The Enterprise Secure Network (ESN) environment operates at the Secret/Restricted Data level and consists of independent site installations of standardized hardware and software integrated through a common infrastructure and shared policies and procedures.
- Other classified networks enable communication and sharing of information regarding NNSA's mission.

The investments within NNSA IT seek to modernize technology across the enterprise to enable mission success.

- Provide classified IT infrastructure enhancements and improvements to support both the nuclear security and non-nuclear security activities across the DOE enterprise.
- Leverage modern systems and secure data transfer technologies to improve collaboration and coordination.
- Increase automation capabilities to perform rapid, reliable, consistent, and secure technology deployments.
- Use new techniques and technology to achieve rapid development in a modern cloud environment.
- Partner with DOE to ensure technology services meet organizational requirements.

To think, behave, and respond as one cohesive agency with a shared, critical national security mission, it is necessary to re-engineer the telecommunications networks and improve service offerings. Such efforts outfit employees with effective communication tools and maximize efficiency, lower operational costs, remove technical barriers, and facilitate collaboration. To that end, the IT Program enhances enterprise services to support emerging technologies and the NNSA mission. Classified computing is currently deployed at NNSA and multiple DOE sites, Federal agencies, other organizations, and select allied nations. The footprint of the enterprise networks continues to expand as NNSA's mission requirements increase and/or change.

The ESN serves as the base network for the classified commodity services, which entails an approach to classified collaborative computing that uses a secure Virtual Desktop Infrastructure (VDI) to facilitate information sharing among disparate DOE/NNSA entities. The IT Program consistently evaluates the site installations for areas that can be consolidated to enterprise services and centrally hosted and managed.

IT commodity-based computing infrastructure facilitates effective collaboration and information sharing for NNSA Federal employees and support contractors to execute the NNSA mission. Through regular communication with DOE/NNSA leadership, DOE IT organizations, contract partners in the labs and field, and associates across the Federal IT community, NNSA identified an opportunity to implement an IT strategy that leverages managed services and cloud technologies. NNSA's focus on a managed service model enables NNSA to take advantage of new and emerging technologies while maximizing efficient use of resources. The strategy presents many opportunities to participate in economies of scale and relies on industry's rapid development and testing practices to ensure NNSA is using secure, modern technology. Additionally, NNSA is moving towards directly funding IT modernization projects across the enterprise.

Highlights of the FY 2024 Budget Request

- Implement a strong and comprehensive IT Program that supports the NSE mission through the recapitalizing and modernizing of aging infrastructure.
- Advance a managed service model that will enable and support new technologies.
- Invest in IT research and development capabilities, operational technology, machine learning, and artificial intelligence to secure future NNSA operations.
- Strengthen inherited legacy networks, systems, and applications.
- Further implement the NNSA Application Modernization Strategy for both mission and non-mission applications.
- Support the modernization of networks and leverage cloud technologies to strengthen redundancies.
- Engage externally with other government agencies and mission partners.
- Improve the reliability of VTC capabilities for classified systems.

FY 2025 – FY 2028 Key Milestones

- Provide classified IT infrastructure enhancements and improvements to support both the nuclear security and non-nuclear security activities across the DOE enterprise.
- Develop architecture of the classified wireless network for non-pit production facilities.
- Leverage modern systems and secure data transfer technologies to improve collaboration and coordination.
- Increase automation capabilities to perform rapid, reliable, consistent, and secure technology deployments.
- Partner with DOE OCIO, DOE IN, M&Os, and OGAs to ensure technology services meet organizational requirements and to provide the systems, tools, training, and support to leverage NNSA data for mission requirements.
- Develop a roadmap to support and sustain advanced analytic capabilities, including artificial intelligence and machine learning, from the research and development phase to production and deployment.

FY 2022 Accomplishments

- Implemented modernization projects to begin improvements in collaboration and communication, working closely with the Department and element CIOs and IT Managers to move to Windows 10 and Microsoft 365.
- Developed and implemented services and solutions to provide operational connectivity during COVID-19.
- Improved application development and implementation with updated tools and technologies.

Information Technology
Funding

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Information Technology $230,203,000	**Information Technology $262,477,000**	**Information Technology +$32,274,000**
• Supports ESC including the labor, hardware, and software to support the ESN and NSN environments managed by the NNSA OCIO with support from the M&O partners. • Transitions the NNSA OCIO into a managed service model. This focus enables NNSA to take advantage of new and emerging technologies while maximizing efficient use of resources. • Promotes modernization of the network architecture, as well as upgrades and enhances security capabilities for the classified systems, including ECN. • Supports IT services for NNSA Federal staff. This includes the cost of unclassified applications, software, hardware, and local classified labor and software/hardware and unclassified. • Provides support for unclassified desktop commodity IT services. • Supports operation of classified networks not included in ESC with unique mission requirements that require separate systems. • Improves the reliability of VTC capabilities for classified system.	• Addresses inherited legacy classified networks, systems, and applications that need modernization. • Includes further investment in capabilities like ECN. • Modernizes technology to support collaboration and innovation, including improving collaboration tools for both classified and unclassified network environments. • Continues to leverage cloud infrastructure.	• The increase in funding reflects continued modernization of the network architecture and classified systems, including ECN, with a focus on improvement and modernization of the systems and user experience. • Funding includes investment in machine learning, artificial intelligence, and automation as part of these modernization efforts.

Information Technology and Cybersecurity
Other Information

Full Cost Recovery Estimates

The FY 2024 Budget Request provides direct funding for mission-driven activities to achieve IT and cybersecurity solutions. Because some support is directed to other programs for materials and services provided to agencies outside the Department, these costs will be allocated to the SPP customers as work is accomplished at the contractor site. The table below provides an estimate of costs that will be recovered from SPP customers.

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Site					
Kansas City National Security Campus	710	710	740	+30	4.2%
Lawrence Livermore National Laboratory	2,400	2,400	2,501	+101	4.2%
Los Alamos National Laboratory	1,216	1,216	1,267	+51	4.2%
Nevada National Security Site	400	400	417	+17	4.2%
NNSA Production Office	98	98	102	+4	4.2%
Sandia National Laboratories	9,734	9,734	10,143	+409	4.2%
Savannah River Site	0	0	0	0	0%
Total	**14,558**	**14,558**	**15,170**	**+611**	**4.2%**

DEPARTMENT OF ENERGY
Funding by Site
Weapons Activities - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Argonne National Laboratory			
Tritium & Domestic Uranium Enrichment	40	0	43
Tritium and Domestic Uranium Enrichment	40	0	43
Production Modernization	40	0	43
Dynamic Materials Properties	9,050	7,375	5,100
Assessment Science	9,050	7,375	5,100
Advanced Simulation and Computing	100	0	0
Advanced Simulation & Computing	100	0	0
Stockpile Research, Technology, and Engineering	9,150	7,375	5,100
Total Argonne National Laboratory	**9,190**	**7,375**	**5,143**
Brookhaven National Laboratory			
Safety and Environmental Operations	414	437	525
Operating	414	437	525
Infrastructure and Operations	414	437	525
Total Brookhaven National Laboratory	**414**	**437**	**525**
Idaho National Laboratory			
Tritium & Domestic Uranium Enrichment	2,467	2,928	2,120
Tritium and Domestic Uranium Enrichment	2,467	2,928	2,120
Production Modernization	2,467	2,928	2,120
Weapons Survivability	241	0	0
Engineering and Integrated Assessments	241	0	0
Stockpile Research, Technology, and Engineering	241	0	0
Safety and Environmental Operations	1,461	600	635
Operating	1,461	600	635
Infrastructure and Operations	1,461	600	635
Total Idaho National Laboratory	**4,169**	**3,528**	**2,755**
Kansas City National Security Complex (KCNSC)			
B61-12 LEP	241,607	146,696	105,700
W88 ALT 370	76,846	43,106	14,307
W80-4 LEP	228,131	187,889	182,843
W87-1 Modification Program	75,000	97,000	152,069
W93 Program	3,000	12,000	32,318
Stockpile Major Modernization	624,584	486,691	487,237
Stockpile Sustainment	144,204	155,954	153,912
Weapons Dismantlement and Disposition	250	350	200
Production Operations	91,013	126,419	140,732
Nuclear Enterprise Assurance	0	8,173	8,000
Stockpile Management	860,051	777,587	790,081
Enterprise Plutonium Support	11,684	9,500	14,125
Plutonium Modernization	11,684	9,500	14,125
Primary Capability Modernization	11,684	9,500	14,125
Secondary Capability Modernization (SCM)	285	1,000	470
Secondary Capability Modernization	285	1,000	470
Tritium & Domestic Uranium Enrichment	1,900	0	0
Tritium and Domestic Uranium Enrichment	1,900	0	0
Non-Nuclear Capability Modernization	53,878	44,322	75,600
Total, Non-Nuclear Capability Modernization	53,878	44,322	75,600
Capability Based Investments	5,436	7,000	8,000
Production Modernization	73,183	61,822	98,195
Archiving and Support	403	316	349
Studies and Assessments	0	100	1,000
Aging and Lifetimes	4,515	4,852	2,358

DEPARTMENT OF ENERGY
Funding by Site
Weapons Activities - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Stockpile Responsiveness	2,566	4,638	4,980
Advanced Certification and Qualification	2,756	2,652	3,494
Engineering and Integrated Assessments	10,240	12,558	12,181
Weapons Technology & Manufacturing Modernization	29,705	26,977	37,127
Weapons Technology and Manufacturing Maturation	29,705	26,977	37,127
Advanced Simulation and Computing	3,500	3,500	0
Advanced Simulation & Computing	3,500	3,500	0
Stockpile Research, Technology, and Engineering	43,445	43,035	49,308
Operations of Facilities	98,000	90,000	85,000
Safety and Environmental Operations	9,109	3,391	2,059
Maintenance and Repair of Facilities	35,000	22,000	27,000
Infrastructure and Safety	50,803	65,460	50,602
Recapitalization	50,803	65,460	50,602
Operating	192,912	180,851	164,661
Infrastructure and Operations	192,912	180,851	164,661
STA Operations and Equipment	37,567	48,960	53,897
Secure Transportation Asset	37,567	48,960	53,897
Operations and Maintenance - DNS	22,004	22,080	25,570
Defense Nuclear Security (DNS)	22,004	22,080	25,570
Information Technology and Cyber Security	86,253	22,726	49,230
Total Kansas City National Security Complex (KCNSC)	**1,315,415**	**1,157,061**	**1,230,942**
Lawrence Berkeley National Laboratory			
Weapons Technology & Manufacturing Modernization	300	0	0
Weapons Technology and Manufacturing Maturation	300	0	0
Stockpile Research, Technology, and Engineering	300	0	0
Information Technology and Cyber Security	231	530	610
Total Lawrence Berkeley National Laboratory	**531**	**530**	**610**
Lawrence Livermore National Laboratory			
W80-4 LEP	163,059	173,050	131,500
W87-1 Modification Program	225,000	151,000	246,836
W93 Program	3,000	2,957	3,000
Stockpile Major Modernization	391,059	327,007	381,336
Stockpile Sustainment	98,395	96,772	99,962
Weapons Dismantlement and Disposition	2,800	2,000	2,605
Production Operations	5,476	5,748	8,225
Nuclear Enterprise Assurance	0	5,634	9,000
Stockpile Management	497,730	437,161	501,128
Enterprise Plutonium Support	68,580	56,260	53,460
Plutonium Modernization	68,580	56,260	53,460
High Explosives & Energetics	14,000	17,500	15,000
HE & Energetics	14,000	17,500	15,000
Primary Capability Modernization	82,580	73,760	68,460
Secondary Capability Modernization (SCM)	11,624	16,200	19,988
Secondary Capability Modernization	11,624	16,200	19,988
Tritium & Domestic Uranium Enrichment	40	0	43
Tritium and Domestic Uranium Enrichment	40	0	43
Non-Nuclear Capability Modernization	1,635	300	640
Total, Non-Nuclear Capability Modernization	1,635	300	640
Capability Based Investments	30,120	31,900	31,000
Production Modernization	125,999	122,160	120,131
Primary Assessment Technologies	50,300	52,411	52,100
Dynamic Materials Properties	43,009	44,764	45,348
Advanced Diagnostics	11,320	9,540	10,743
Secondary Assessment Technologies	39,880	33,811	34,347

(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Enhanced Capabilities for Subcritical Experiments	65,196	107,542	121,900
Hydrodynamic and Subcritical Experiment Execution Support	30,098	27,598	25,498
Assessment Science	239,803	275,666	289,936
Archiving and Support	13,886	13,215	13,880
Delivery Environments	11,000	11,518	9,717
Weapons Survivability	15,487	15,889	14,016
Studies and Assessments	0	2,000	25,000
Aging and Lifetimes	17,300	17,300	13,600
Stockpile Responsiveness	14,073	16,036	17,346
Advanced Certification and Qualification	18,058	17,375	18,028
Engineering and Integrated Assessments	89,804	93,333	111,587
Inertial Confinement Fusion	350,000	380,000	377,000
Weapons Technology & Manufacturing Modernization	33,274	34,777	37,955
Weapons Technology and Manufacturing Maturation	33,274	34,777	37,955
Academic Programs and Community Support	1,000	1,000	1,000
Advanced Simulation and Computing	280,089	192,697	196,854
Advanced Simulation & Computing	280,089	192,697	196,854
Stockpile Research, Technology, and Engineering	993,970	977,473	1,014,332
Operations of Facilities	82,000	82,000	80,000
Safety and Environmental Operations	35,172	35,646	33,017
Maintenance and Repair of Facilities	37,000	37,000	42,000
Infrastructure and Safety	117,240	81,175	60,422
Recapitalization	117,240	81,175	60,422
Operating	271,412	235,821	215,439
22-D-514 Digital Infrastructure Capability Expansion, LLNL	8,000	67,300	0
Mission Enabling Construction	8,000	67,300	0
I&O - Construction	8,000	67,300	0
Infrastructure and Operations	279,412	303,121	215,439
Operations and Maintenance - DNS	71,302	79,436	82,037
Defense Nuclear Security (DNS)	71,302	79,436	82,037
Information Technology and Cyber Security	34,760	48,998	54,854
Total Lawrence Livermore National Laboratory	**2,003,173**	**1,968,349**	**1,987,921**
Livermore Site Office			
Infrastructure and Safety	0	17,850	0
Recapitalization	0	17,850	0
Operating	0	17,850	0
Infrastructure and Operations	0	17,850	0
Total Livermore Site Office	**0**	**17,850**	**0**
Los Alamos National Laboratory			
B61-12 LEP	45,556	37,010	31,451
W88 ALT 370	9,798	11,418	15,234
W80-4 LEP	56,850	57,572	82,194
W87-1 Modification Program	17,500	15,000	27,585
W93 Program	28,000	89,900	135,000
Stockpile Major Modernization	157,704	210,900	291,464
Stockpile Sustainment	218,910	268,753	265,774
Weapons Dismantlement and Disposition	2,800	2,000	3,750
Production Operations	46,228	48,457	70,730
Nuclear Enterprise Assurance	0	5,236	7,000
Stockpile Management	425,642	535,346	638,718
Los Alamos Plutonium Operations	641,400	750,871	800,377
21-D-512, Plutonium Pit Production Project, LANL	343,900	583,234	670,000
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	26,250	29,502	30,000
07-D-220-04, Transuranic Liquid Waste Facility, LANL	29,500	24,259	0

DEPARTMENT OF ENERGY
Funding by Site
Weapons Activities - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	136,123	133,123	227,122
Los Alamos Plutonium Modernization	1,177,173	1,520,989	1,727,499
Savannah River Plutonium Operations	2,400	0	0
Savannah River Plutonium Modernization	2,400	0	0
Plutonium Modernization	1,179,573	1,520,989	1,727,499
High Explosives & Energetics	13,230	15,500	13,280
23-D-516, Energetic Materials Characterization Facility, LANL	0	18,500	0
HE & Energetics	13,230	34,000	13,280
Primary Capability Modernization	1,192,803	1,554,989	1,740,779
Secondary Capability Modernization (SCM)	31,179	25,939	34,700
Secondary Capability Modernization	31,179	25,939	34,700
Tritium & Domestic Uranium Enrichment	2,040	2,041	2,043
Tritium and Domestic Uranium Enrichment	2,040	2,041	2,043
Non-Nuclear Capability Modernization	800	945	1,110
Total, Non-Nuclear Capability Modernization	800	945	1,110
Capability Based Investments	38,274	11,300	19,000
Production Modernization	1,265,096	1,595,214	1,797,632
Primary Assessment Technologies	77,535	84,893	90,851
Dynamic Materials Properties	36,690	36,760	38,422
Advanced Diagnostics	5,485	5,600	5,700
Secondary Assessment Technologies	32,104	28,003	28,645
Enhanced Capabilities for Subcritical Experiments	57,030	75,600	86,625
Hydrodynamic and Subcritical Experiment Execution Support	56,207	62,876	66,020
Assessment Science	265,051	293,732	316,263
Archiving and Support	16,600	17,004	19,834
Delivery Environments	11,500	10,500	10,628
Weapons Survivability	13,470	14,000	14,016
Studies and Assessments	0	0	20,000
Aging and Lifetimes	20,200	22,288	16,321
Stockpile Responsiveness	14,854	18,750	17,346
Advanced Certification and Qualification	21,574	20,578	21,538
Engineering and Integrated Assessments	98,198	103,120	119,683
Inertial Confinement Fusion	22,600	25,000	22,600
Weapons Technology & Manufacturing Modernization	69,795	67,618	70,199
Weapons Technology and Manufacturing Maturation	69,795	67,618	70,199
Advanced Simulation and Computing	199,398	175,267	183,853
Advanced Simulation & Computing	199,398	175,267	183,853
Stockpile Research, Technology, and Engineering	655,042	664,737	712,598
Operations of Facilities	287,000	320,000	320,000
Safety and Environmental Operations	15,704	16,397	13,553
Maintenance and Repair of Facilities	150,000	145,000	151,000
Infrastructure and Safety	98,243	91,354	59,939
Recapitalization	98,243	91,354	59,939
Operating	550,947	572,751	544,492
24-D-511 Plutonium Production Building, LANL	0	0	48,500
24-D-512 TA-46 Protective Force Facility, LANL	0	0	48,500
23-D-518 Plutonium Modernization Operations & Waste Management Office Bldg, LANL	0	48,500	0
23-D-517 Electrical Power Capacity Upgrade, LANL	0	24,000	75,000
Mission Enabling Construction	0	72,500	172,000
I&O - Construction	0	72,500	172,000
Infrastructure and Operations	550,947	645,251	716,492
Operations and Maintenance - DNS	153,167	134,945	160,419
Defense Nuclear Security (DNS)	153,167	134,945	160,419
Information Technology and Cyber Security	20,446	24,581	27,207
Total Los Alamos National Laboratory	**3,070,340**	**3,600,074**	**4,053,066**

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Los Alamos Site Office			
Information Technology and Cyber Security	17	42	27
Total Los Alamos Site Office	**17**	**42**	**27**
National Energy Technology Lab			
B61-12 LEP	0	1,366	0
W88 ALT 370	5,462	0	0
W80-4 LEP	13,100	7,817	0
W87-1 Modification Program	2,885	8,266	0
W93 Program	200	3,997	0
Stockpile Major Modernization	21,647	21,446	0
Stockpile Sustainment	10,976	16,340	0
Production Operations	2,498	3,000	0
Nuclear Enterprise Assurance	0	1,662	0
Stockpile Management	35,121	42,448	0
Enterprise Plutonium Support	5,000	5,500	5,720
Plutonium Modernization	5,000	5,500	5,720
Primary Capability Modernization	5,000	5,500	5,720
Secondary Capability Modernization (SCM)	2,000	0	0
Secondary Capability Modernization	2,000	0	0
Tritium & Domestic Uranium Enrichment	580	1,905	3,530
Tritium and Domestic Uranium Enrichment	580	1,905	3,530
Non-Nuclear Capability Modernization	2,673	4,527	4,732
Total, Non-Nuclear Capability Modernization	2,673	4,527	4,732
Production Modernization	10,253	11,932	13,982
Hydrodynamic and Subcritical Experiment Execution Support	250	0	0
Assessment Science	250	0	0
Archiving and Support	374	0	389
Delivery Environments	246	0	256
Weapons Survivability	468	100	487
Aging and Lifetimes	191	0	196
Stockpile Responsiveness	320	0	334
Advanced Certification and Qualification	327	0	334
Engineering and Integrated Assessments	1,926	100	1,996
Weapons Technology & Manufacturing Modernization	2,563	0	2,311
Weapons Technology and Manufacturing Maturation	2,563	0	2,311
Advanced Simulation and Computing	250	0	0
Advanced Simulation & Computing	250	0	0
Stockpile Research, Technology, and Engineering	4,989	100	4,307
Total National Energy Technology Lab	**50,363**	**54,480**	**18,289**
Naval Research Laboratory			
Dynamic Materials Properties	0	300	0
Advanced Diagnostics	1,276	1,600	1,600
Secondary Assessment Technologies	1,324	2,500	2,500
Enhanced Capabilities for Subcritical Experiments	400	400	400
Assessment Science	3,000	4,800	4,500
Inertial Confinement Fusion	6,000	4,500	0
Stockpile Research, Technology, and Engineering	9,000	9,300	4,500
Total Naval Research Laboratory	**9,000**	**9,300**	**4,500**
Nevada Field Office			
Hydrodynamic and Subcritical Experiment Execution Support	95	0	0
Assessment Science	95	0	0
Stockpile Research, Technology, and Engineering	95	0	0

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Information Technology and Cyber Security	995	1,350	1,560
Total Nevada Field Office	**1,090**	**1,350**	**1,560**
Nevada National Security Site			
Stockpile Sustainment	526	1,571	643
Nuclear Enterprise Assurance	0	4,000	6,000
Stockpile Management	526	5,571	6,643
Enterprise Plutonium Support	13,200	11,087	11,558
Plutonium Modernization	13,200	11,087	11,558
High Explosives & Energetics	2,000	2,500	2,260
HE & Energetics	2,000	2,500	2,260
Primary Capability Modernization	15,200	13,587	13,818
Tritium & Domestic Uranium Enrichment	150	0	163
Tritium and Domestic Uranium Enrichment	150	0	163
Non-Nuclear Capability Modernization	110	50	114
Total, Non-Nuclear Capability Modernization	110	50	114
Capability Based Investments	18,850	16,850	15,000
Production Modernization	34,310	30,487	29,095
Primary Assessment Technologies	1,250	900	1,500
Dynamic Materials Properties	12,145	7,704	10,000
Advanced Diagnostics	6,660	6,124	6,300
Secondary Assessment Technologies	248	0	0
Enhanced Capabilities for Subcritical Experiments	46,527	55,155	33,900
Hydrodynamic and Subcritical Experiment Execution Support	54,200	47,848	51,558
17-D-640, U1a Complex Enhancements Project, NNSS	100,274	48,130	121,570
24-D-513 ZEUS Test Bed Facilities Improvement, NNSS	0	0	80,000
Assessment Science	221,304	165,861	304,828
Archiving and Support	3,353	3,389	3,348
Advanced Certification and Qualification	3,992	3,841	3,985
Engineering and Integrated Assessments	7,345	7,230	7,333
Inertial Confinement Fusion	5,500	4,661	4,000
Weapons Technology & Manufacturing Modernization	1,598	1,220	1,192
Weapons Technology and Manufacturing Maturation	1,598	1,220	1,192
Stockpile Research, Technology, and Engineering	235,747	178,972	317,353
Operations of Facilities	105,000	105,000	105,000
Safety and Environmental Operations	4,613	3,684	4,178
Maintenance and Repair of Facilities	65,000	70,000	70,000
Infrastructure and Safety	52,213	33,850	60,150
Recapitalization	52,213	33,850	60,150
Operating	226,826	212,534	239,328
Infrastructure and Operations	226,826	212,534	239,328
Program Direction - STA - Federal Support	7	260	347
Secure Transportation Asset	7	260	347
Operations and Maintenance - DNS	90,111	91,130	118,156
Defense Nuclear Security (DNS)	90,111	91,130	118,156
Information Technology and Cyber Security	49,826	40,337	44,594
Total Nevada National Security Site	**637,353**	**559,291**	**755,516**
NNSA Albuquerque Complex			
B61-12 LEP	207,534	322,114	81,029
W88 ALT 370	31,888	46,503	43,949
W80-4 LEP	46,730	106,634	69,631
W80-4 ALT-SLCM	10,000	0	0
W87-1 Modification Program	10,000	15,061	41,605
W93 Program	12,800	69,795	124,594
Stockpile Major Modernization	318,952	560,107	360,808

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Stockpile Sustainment	95,817	121,890	86,800
Weapons Dismantlement and Disposition	0	5,667	1,103
Production Operations	11,928	19,378	8,093
Nuclear Enterprise Assurance	0	3,577	6,596
Stockpile Management	426,697	710,619	463,400
Los Alamos Plutonium Operations	8,783	6,565	20,237
21-D-512, Plutonium Pit Production Project, LANL	4,100	0	0
Los Alamos Plutonium Modernization	12,883	6,565	20,237
Enterprise Plutonium Support	6,974	5,235	1,360
Plutonium Modernization	19,857	11,800	21,597
Primary Capability Modernization	19,857	11,800	21,597
Secondary Capability Modernization (SCM)	200	0	0
Secondary Capability Modernization	200	0	0
Tritium & Domestic Uranium Enrichment	144,119	138,086	110,253
Tritium and Domestic Uranium Enrichment	144,119	138,086	110,253
Production Modernization	164,176	149,886	131,850
Dynamic Materials Properties	6,500	6,500	6,500
Secondary Assessment Technologies	50	0	0
Assessment Science	6,550	6,500	6,500
Archiving and Support	821	705	417
Delivery Environments	1,069	1,734	4,309
Weapons Survivability	2,717	3,668	1,767
Studies and Assessments	0	985	6,885
Aging and Lifetimes	10,558	8,293	3,806
Stockpile Responsiveness	2,733	3,290	4,635
Advanced Certification and Qualification	4,216	2,667	904
Engineering and Integrated Assessments	22,114	21,342	22,723
Inertial Confinement Fusion	33,000	35,000	19,000
Weapons Technology & Manufacturing Modernization	9,707	11,288	27,219
Weapons Technology and Manufacturing Maturation	9,707	11,288	27,219
Academic Programs and Community Support	110,912	110,912	151,271
Advanced Simulation and Computing	73,587	212,157	168,000
Advanced Simulation & Computing	73,587	212,157	168,000
Stockpile Research, Technology, and Engineering	255,870	397,199	394,713
Safety and Environmental Operations	0	675	0
Infrastructure and Safety	21,906	0	0
Recapitalization	21,906	0	0
Operating	21,906	675	0
Infrastructure and Operations	21,906	675	0
STA Operations and Equipment	80,713	83,593	106,720
Secure Transportation Asset	80,713	83,593	106,720
Operations and Maintenance - DNS	9,137	11,777	11,825
Defense Nuclear Security (DNS)	9,137	11,777	11,825
Total NNSA Albuquerque Complex	**958,499**	**1,353,749**	**1,108,508**
NNSA Production Office (NPO)			
06-D-141, Uranium Processing Facility, Y-12	13,000	14,500	22,800
Secondary Capability Modernization	13,000	14,500	22,800
Production Modernization	13,000	14,500	22,800
Total NNSA Production Office (NPO)	**13,000**	**14,500**	**22,800**
Oak Ridge Institute for Science & Education			
Information Technology and Cyber Security	2,000	2,000	2,000
Total Oak Ridge Institute for Science & Education	**2,000**	**2,000**	**2,000**
Oak Ridge National Laboratory			

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Secondary Capability Modernization (SCM)	45	0	0
Secondary Capability Modernization	45	0	0
Tritium & Domestic Uranium Enrichment	0	62,760	120,000
Tritium and Domestic Uranium Enrichment	0	62,760	120,000
Non-Nuclear Capability Modernization	0	600	0
Total, Non-Nuclear Capability Modernization	0	600	0
Capability Based Investments	665	601	0
Production Modernization	710	63,961	120,000
Aging and Lifetimes	1,000	200	0
Engineering and Integrated Assessments	1,000	200	0
Weapons Technology & Manufacturing Modernization	50	0	0
Weapons Technology and Manufacturing Maturation	50	0	0
Advanced Simulation and Computing	831	0	0
Advanced Simulation & Computing	831	0	0
Stockpile Research, Technology, and Engineering	1,881	200	0
Safety and Environmental Operations	9,255	7,705	8,479
Operating	9,255	7,705	8,479
Infrastructure and Operations	9,255	7,705	8,479
Total Oak Ridge National Laboratory	**11,846**	**71,866**	**128,479**
Office of Scientific & Technical Information			
Primary Assessment Technologies	220	220	220
Assessment Science	220	220	220
Stockpile Research, Technology, and Engineering	220	220	220
Information Technology and Cyber Security	328	439	444
Total Office of Scientific & Technical Information	**548**	**659**	**664**
Pacific Northwest National Laboratory			
Nuclear Enterprise Assurance	0	3,230	4,000
Stockpile Management	0	3,230	4,000
Secondary Capability Modernization (SCM)	2,420	3,885	2,875
Secondary Capability Modernization	2,420	3,885	2,875
Tritium & Domestic Uranium Enrichment	67,451	79,843	70,732
Tritium and Domestic Uranium Enrichment	67,451	79,843	70,732
Non-Nuclear Capability Modernization	777	480	830
Total, Non-Nuclear Capability Modernization	777	480	830
Capability Based Investments	0	3,685	0
Production Modernization	70,648	87,893	74,437
Aging and Lifetimes	0	400	0
Engineering and Integrated Assessments	0	400	0
Weapons Technology & Manufacturing Modernization	1,530	1,350	810
Weapons Technology and Manufacturing Maturation	1,530	1,350	810
Stockpile Research, Technology, and Engineering	1,530	1,750	810
Safety and Environmental Operations	6,190	3,036	2,940
Operating	6,190	3,036	2,940
Infrastructure and Operations	6,190	3,036	2,940
Information Technology and Cyber Security	3	250	0
Total Pacific Northwest National Laboratory	**78,371**	**96,159**	**82,187**
Pantex Plant			
B61-12 LEP	62,445	65,805	81,738
W88 ALT 370	52,136	46,404	88,544
W80-4 LEP	30,450	64,050	79,680
W87-1 Modification Program	12,000	18,000	38,828
W93 Program	1,000	2,000	4,000
Stockpile Major Modernization	158,031	196,259	292,790

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Stockpile Sustainment	103,924	106,014	130,209
Weapons Dismantlement and Disposition	27,086	12,537	23,466
Production Operations	121,227	122,023	127,682
Nuclear Enterprise Assurance	0	3,010	3,621
Stockpile Management	410,268	439,843	577,768
Enterprise Plutonium Support	0	254	300
Plutonium Modernization	0	254	300
High Explosives & Energetics	14,000	20,000	18,500
21-D-510, HE Synthesis, Formulation, and Production, PX	43,500	107,000	0
15-D-301, HE Science & Engineering Facility, PX	0	19,500	100,356
HE & Energetics	57,500	146,500	118,856
Primary Capability Modernization	57,500	146,754	119,156
Non-Nuclear Capability Modernization	60	79	66
Total, Non-Nuclear Capability Modernization	60	79	66
Capability Based Investments	10,670	18,590	11,000
Production Modernization	68,230	165,423	130,222
Studies and Assessments	0	100	1,000
Aging and Lifetimes	2,600	3,089	2,360
Stockpile Responsiveness	2,097	3,600	3,669
Advanced Certification and Qualification	901	1,281	1,497
Engineering and Integrated Assessments	5,598	8,070	8,526
Weapons Technology & Manufacturing Modernization	3,528	2,944	7,173
Weapons Technology and Manufacturing Maturation	3,528	2,944	7,173
Stockpile Research, Technology, and Engineering	9,126	11,014	15,699
Operations of Facilities	80,000	83,000	83,000
Safety and Environmental Operations	26,660	23,002	17,654
Maintenance and Repair of Facilities	115,000	108,000	118,000
Infrastructure and Safety	69,764	41,989	36,600
Recapitalization	69,764	41,989	36,600
Operating	291,424	255,991	255,254
24-D-510 Analytic Gas Laboratory, PX	0	0	35,000
Mission Enabling Construction	0	0	35,000
I&O - Construction	0	0	35,000
Infrastructure and Operations	291,424	255,991	290,254
STA Operations and Equipment	7,139	6,259	8,485
Secure Transportation Asset	7,139	6,259	8,485
Operations and Maintenance - DNS	147,100	155,621	161,995
Defense Nuclear Security (DNS)	147,100	155,621	161,995
Information Technology and Cyber Security	8,721	9,263	11,306
Total Pantex Plant	**942,008**	**1,043,414**	**1,195,729**
Portsmouth Gaseous Diffusion Plant			
Secondary Capability Modernization (SCM)	0	10,000	30,000
Secondary Capability Modernization	0	10,000	30,000
Tritium & Domestic Uranium Enrichment	0	30,000	30,000
Tritium and Domestic Uranium Enrichment	0	30,000	30,000
Production Modernization	0	40,000	60,000
Total Portsmouth Gaseous Diffusion Plant	**0**	**40,000**	**60,000**
Princeton Plasma Physics Laboratory			
Inertial Confinement Fusion	465	0	0
Stockpile Research, Technology, and Engineering	465	0	0
Total Princeton Plasma Physics Laboratory	**465**	**0**	**0**
Sandia National Laboratories			
B61-12 LEP	99,362	56,528	39,184

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
W88 ALT 370	26,473	12,145	14,038
W80-4 LEP	483,479	489,539	368,703
W87-1 Modification Program	225,000	307,500	443,456
W93 Program	22,000	54,865	71,151
Stockpile Major Modernization	856,314	920,577	936,532
Stockpile Sustainment	394,410	385,089	401,206
Weapons Dismantlement and Disposition	3,500	2,450	2,800
Production Operations	136,796	171,934	192,190
Nuclear Enterprise Assurance	0	6,257	12,278
Stockpile Management	1,391,020	1,486,307	1,545,006
21-D-511, Savannah River Plutonium Processing Facility, SRS	1,250	0	0
Savannah River Plutonium Modernization	1,250	0	0
Plutonium Modernization	1,250	0	0
High Explosives & Energetics	14,200	14,700	15,200
HE & Energetics	14,200	14,700	15,200
Primary Capability Modernization	15,450	14,700	15,200
Tritium & Domestic Uranium Enrichment	527	905	664
Tritium and Domestic Uranium Enrichment	527	905	664
Non-Nuclear Capability Modernization	51,355	60,046	62,000
22-D-513, Power Sources Capability, SNL	8,000	0	36,386
Total, Non-Nuclear Capability Modernization	59,355	60,046	98,386
Capability Based Investments	19,800	17,600	29,000
Production Modernization	95,132	93,251	143,250
Primary Assessment Technologies	12,000	11,000	10,500
Dynamic Materials Properties	15,625	15,536	15,776
Advanced Diagnostics	10,190	8,200	9,449
Secondary Assessment Technologies	8,930	6,250	7,049
Enhanced Capabilities for Subcritical Experiments	22,461	27,801	41,000
Hydrodynamic and Subcritical Experiment Execution Support	1,700	0	0
Assessment Science	70,906	68,787	83,774
Archiving and Support	9,614	8,750	5,692
Delivery Environments	14,812	13,433	12,979
Weapons Survivability	26,196	58,433	53,960
Studies and Assessments	0	1,750	25,000
Aging and Lifetimes	19,200	19,200	15,377
Stockpile Responsiveness	11,885	13,000	17,346
Advanced Certification and Qualification	6,653	7,819	7,088
Engineering and Integrated Assessments	88,360	122,385	137,442
Inertial Confinement Fusion	67,138	82,600	76,638
Weapons Technology & Manufacturing Modernization	122,116	122,605	122,728
Weapons Technology and Manufacturing Maturation	122,116	122,605	122,728
Advanced Simulation and Computing	175,618	168,999	170,704
Advanced Simulation & Computing	175,618	168,999	170,704
Stockpile Research, Technology, and Engineering	524,138	565,376	591,286
Operations of Facilities	125,000	106,000	103,000
Safety and Environmental Operations	7,700	11,069	11,417
Maintenance and Repair of Facilities	24,000	24,000	33,000
Infrastructure and Safety	61,176	45,179	58,587
Recapitalization	61,176	45,179	58,587
Operating	217,876	186,248	206,004
Infrastructure and Operations	217,876	186,248	206,004
STA Operations and Equipment	88,285	75,555	69,906
Secure Transportation Asset	88,285	75,555	69,906
Operations and Maintenance - DNS	74,386	74,097	77,198
Defense Nuclear Security (DNS)	74,386	74,097	77,198
Information Technology and Cyber Security	38,153	48,701	48,741
Total Sandia National Laboratories	**2,428,990**	**2,529,535**	**2,681,391**

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Savannah River National Laboratory			
Operations of Facilities	0	0	34,000
Maintenance and Repair of Facilities	0	0	8,000
Operating	0	0	42,000
Infrastructure and Operations	0	0	42,000
Total Savannah River National Laboratory	**0**	**0**	**42,000**
Savannah River Operations Office			
Savannah River Plutonium Operations	5,933	1,004	0
21-D-511, Savannah River Plutonium Processing Facility, SRS	7,000	7,500	0
Savannah River Plutonium Modernization	12,933	8,504	0
Plutonium Modernization	12,933	8,504	0
Primary Capability Modernization	12,933	8,504	0
Tritium & Domestic Uranium Enrichment	150	305	0
18-D-650, Tritium Finishing Facility, SRS	1,500	0	0
Tritium and Domestic Uranium Enrichment	1,650	305	0
Production Modernization	14,583	8,809	0
Infrastructure and Safety	1,750	0	24,250
Recapitalization	1,750	0	24,250
Operating	1,750	0	24,250
Infrastructure and Operations	1,750	0	24,250
Information Technology and Cyber Security	497	446	279
Total Savannah River Operations Office	**16,830**	**9,255**	**24,529**
Savannah River Site			
B61-12 LEP	16,200	14,500	13,000
W80-4 LEP	3,203	2,240	4,500
W87-1 Modification Program	3,000	3,300	4,392
W93 Program	500	1,183	2,000
Stockpile Major Modernization	22,903	21,223	23,892
Stockpile Sustainment	47,885	45,614	51,514
Weapons Dismantlement and Disposition	500	600	500
Production Operations	24,789	25,783	26,048
Nuclear Enterprise Assurance	0	4,622	4,500
Stockpile Management	96,077	97,842	106,454
Savannah River Plutonium Operations	117,683	56,538	61,979
21-D-511, Savannah River Plutonium Processing Facility, SRS	466,750	1,192,500	858,235
Savannah River Plutonium Modernization	584,433	1,249,038	920,214
Plutonium Modernization	584,433	1,249,038	920,214
Primary Capability Modernization	584,433	1,249,038	920,214
Tritium & Domestic Uranium Enrichment	121,634	131,081	135,494
18-D-650, Tritium Finishing Facility, SRS	25,500	73,300	0
Tritium and Domestic Uranium Enrichment	147,134	204,381	135,494
Non-Nuclear Capability Modernization	100	84	112
Total, Non-Nuclear Capability Modernization	100	84	112
Capability Based Investments	7,690	7,920	8,000
Production Modernization	739,357	1,461,423	1,063,820
Enhanced Capabilities for Subcritical Experiments	1,395	1,375	725
Assessment Science	1,395	1,375	725
Aging and Lifetimes	5,160	5,514	2,546
Engineering and Integrated Assessments	5,160	5,514	2,546
Weapons Technology & Manufacturing Modernization	8,323	7,906	8,974
Weapons Technology and Manufacturing Maturation	8,323	7,906	8,974
Stockpile Research, Technology, and Engineering	14,878	14,795	12,245
Operations of Facilities	97,000	95,000	95,000

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	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Safety and Environmental Operations	5,658	3,397	4,902
Maintenance and Repair of Facilities	43,000	40,000	42,000
Infrastructure and Safety	31,881	7,558	3,100
Recapitalization	31,881	7,558	3,100
Operating	177,539	145,955	145,002
Infrastructure and Operations	177,539	145,955	145,002
Operations and Maintenance - DNS	9,064	9,088	10,093
Defense Nuclear Security (DNS)	9,064	9,088	10,093
Information Technology and Cyber Security	6,129	6,242	9,179
Total Savannah River Site	**1,043,044**	**1,735,345**	**1,346,793**
SLAC National Accelerator Laboratory			
Dynamic Materials Properties	0	1,500	0
Assessment Science	0	1,500	0
Inertial Confinement Fusion	180	180	180
Stockpile Research, Technology, and Engineering	180	1,680	180
Total SLAC National Accelerator Laboratory	**180**	**1,680**	**180**
Thomas Jefferson National Accelerator Facility			
Non-Nuclear Capability Modernization	80	0	0
Total, Non-Nuclear Capability Modernization	80	0	0
Production Modernization	80	0	0
Total Thomas Jefferson National Accelerator Facility	**80**	**0**	**0**
University of Rochester			
Inertial Confinement Fusion	83,000	86,100	89,000
Stockpile Research, Technology, and Engineering	83,000	86,100	89,000
Total University of Rochester	**83,000**	**86,100**	**89,000**
Washington Headquarters			
B61-12 LEP	11,960	0	6,748
W88 ALT 370	3,210	1	1,404
W80-4 LEP	16,748	0	30,298
W80-4 ALT-SLCM	0	20,000	0
W87-1 Modification Program	20,646	0	12,528
W93 Program	0	0	7,793
Stockpile Major Modernization	52,564	20,001	58,771
Stockpile Sustainment	21,215	81,282	42,376
Weapons Dismantlement and Disposition	1,595	23,033	1,530
Production Operations	22,758	1,001	19,494
Nuclear Enterprise Assurance	0	750	1,998
Stockpile Management	98,132	126,067	124,169
Los Alamos Plutonium Operations	10,236	9,976	12,486
21-D-512, Plutonium Pit Production Project, LANL	2,000	5,000	0
15-D-302, TA-55 Reinvestments Project, Phase 3, LANL	750	500	0
07-D-220-04, Transuranic Liquid Waste Facility, LANL	500	500	0
04-D-125, Chemistry and Metallurgy Research Replacement Project, LANL	2,000	5,000	0
Los Alamos Plutonium Modernization	15,486	20,976	12,486
Savannah River Plutonium Operations	1,984	758	785
Savannah River Plutonium Modernization	1,984	758	785
Enterprise Plutonium Support	1,660	1,157	1,256
Plutonium Modernization	19,130	22,891	14,527
High Explosives & Energetics	11,355	31,180	29,318
23-D-516, Energetic Materials Characterization Facility, LANL	0	500	0
21-D-510, HE Synthesis, Formulation, and Production, PX	1,000	1,000	0

DEPARTMENT OF ENERGY
Funding by Site
Weapons Activities - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
15-D-301, HE Science & Engineering Facility, PX	0	500	1,000
HE & Energetics	12,355	33,180	30,318
Primary Capability Modernization	31,485	56,071	44,845
Secondary Capability Modernization (SCM)	105,409	74,370	90,255
Secondary Capability Modernization	105,409	74,370	90,255
Tritium & Domestic Uranium Enrichment	146,286	51,795	101,380
Tritium and Domestic Uranium Enrichment	146,286	51,795	101,380
Non-Nuclear Capability Modernization	32,795	11,403	21,469
22-D-513, Power Sources Capability, SNL	5,827	0	1,500
Total, Non-Nuclear Capability Modernization	38,622	11,403	22,969
Capability Based Investments	27,561	27,224	17,462
Planning for Programmatic Construction (Pre-CD-1)	10,000	0	0
Production Modernization	359,363	220,863	276,911
Primary Assessment Technologies	8,695	5,083	5,463
Dynamic Materials Properties	7,962	3,927	7,414
Advanced Diagnostics	1,058	0	1,349
Secondary Assessment Technologies	1,464	1,540	2,339
Enhanced Capabilities for Subcritical Experiments	22,570	9,352	7,823
Hydrodynamic and Subcritical Experiment Execution Support	10,295	4,080	3,087
17-D-640, U1a Complex Enhancements Project, NNSS	34,726	5,000	5,000
Assessment Science	86,770	28,982	32,475
Archiving and Support	709	571	896
Delivery Environments	608	489	499
Weapons Survivability	921	1,213	4,122
Studies and Assessments	0	65	1,039
Aging and Lifetimes	1,346	1,134	941
Stockpile Responsiveness	774	828	907
Advanced Certification and Qualification	797	610	769
Engineering and Integrated Assessments	5,155	4,910	9,173
Inertial Confinement Fusion	12,117	11,959	13,232
Weapons Technology & Manufacturing Modernization	4,535	3,649	4,610
Weapons Technology and Manufacturing Maturation	4,535	3,649	4,610
Advanced Simulation and Computing	13,139	36,380	63,061
Advanced Simulation & Computing	13,139	36,380	63,061
Stockpile Research, Technology, and Engineering	121,716	85,880	122,551
Operations of Facilities	36,000	53,000	43,000
Safety and Environmental Operations	21,804	33,641	21,191
Maintenance and Repair of Facilities	103,000	86,617	99,000
Infrastructure and Safety	38,491	150,556	258,298
Recapitalization	38,491	150,556	258,298
Operating	199,295	323,814	421,489
Infrastructure and Operations	199,295	323,814	421,489
Program Direction - STA - Federal Support	117,053	129,810	117,709
Secure Transportation Asset	117,053	129,810	117,709
Operations and Maintenance - DNS	63,734	92,310	119,070
Defense Nuclear Security (DNS)	63,734	92,310	119,070
Information Technology and Cyber Security	147,812	225,135	314,743
Legacy Contractor Pensions and Settlement Payments - DNN	78,656	114,632	65,452
Total Washington Headquarters	**1,185,761**	**1,318,511**	**1,562,094**
Y-12 National Security Complex			
B61-12 LEP	87,000	28,000	91,000
W88 ALT 370	1,344	2,480	1,347
W80-4 LEP	38,650	33,660	60,580
W87-1 Modification Program	100,000	65,000	101,610
W93 Program	1,500	3,812	9,800

DEPARTMENT OF ENERGY
Funding by Site
Weapons Activities - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Stockpile Major Modernization	228,494	132,952	264,337
Stockpile Sustainment	44,221	41,860	44,182
Weapons Dismantlement and Disposition	17,469	7,363	17,764
Production Operations	106,228	107,151	117,628
Nuclear Enterprise Assurance	0	2,760	3,621
Stockpile Management	396,412	292,086	447,532
18-D-690, Lithium Processing Facility, Y-12	167,902	216,886	210,770
06-D-141, Uranium Processing Facility, Y-12	587,000	347,500	737,200
Secondary Capability Modernization (SCM)	334,935	404,969	488,626
Secondary Capability Modernization	1,089,837	969,355	1,436,596
Tritium & Domestic Uranium Enrichment	1,633	5,000	16,527
Tritium and Domestic Uranium Enrichment	1,633	5,000	16,527
Non-Nuclear Capability Modernization	300	248	317
Total, Non-Nuclear Capability Modernization	300	248	317
Capability Based Investments	28,500	11,550	18,000
Production Modernization	1,120,270	986,153	1,471,440
Aging and Lifetimes	5,190	4,990	2,450
Stockpile Responsiveness	698	3,600	3,319
Advanced Certification and Qualification	1,056	1,281	1,497
Engineering and Integrated Assessments	6,944	9,871	7,266
Weapons Technology & Manufacturing Modernization	5,606	5,831	7,447
Weapons Technology and Manufacturing Maturation	5,606	5,831	7,447
Advanced Simulation and Computing	500	1,000	0
Advanced Simulation & Computing	500	1,000	0
Stockpile Research, Technology, and Engineering	13,050	16,702	14,713
Operations of Facilities	104,000	104,000	105,000
Safety and Environmental Operations	21,614	19,320	18,564
Maintenance and Repair of Facilities	128,000	119,000	128,000
Infrastructure and Safety	56,533	26,692	38,064
Recapitalization	56,533	26,692	38,064
Operating	310,147	269,012	289,628
23-D-519, Special Material Facility, Y-12	0	49,500	0
Mission Enabling Construction	0	49,500	0
I&O - Construction	0	49,500	0
Infrastructure and Operations	310,147	318,512	289,628
Operations and Maintenance - DNS	181,085	197,688	222,393
17-D-710, West End Protected Area Reduction Project, Y-12	23,000	3,928	28,000
Construction - Defense Nuclear Security	23,000	3,928	28,000
Defense Nuclear Security (DNS)	204,085	201,616	250,393
Information Technology and Cyber Security	8,721	9,263	11,306
Total Y-12 National Security Complex	**2,052,685**	**1,824,332**	**2,485,012**
Total Funding by Site - Weapons Activities	**15,920,000**	**17,512,123**	**18,894,519**

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Defense Nuclear Nonproliferation

Defense Nuclear Nonproliferation

Defense Nuclear Nonproliferation
Proposed Appropriation Language

For Department of Energy (DOE) expenses, including the purchase, construction, and acquisition of plant and capital equipment and other incidental expenses necessary for Defense Nuclear Nonproliferation activities, in carrying out the purposes of the DOE Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion $2,508,959,000 to remain available until expended.

Explanation of Change

The FY 2024 Budget Request for the Defense Nuclear Nonproliferation appropriation reflects an overall 0.8% increase from the FY 2023 Enacted level. This change is comprised of increases for: a non-recurring adjustment for the use of prior year balances which were used to offset budgetary requirements in FY 2023; additional Nuclear Incident Response (NIR)/Nuclear Emergency Support Team (NEST) capacity for emergency response and interagency partner technical training, and for National Technical Nuclear Forensics (NTNF) to progress toward meeting newly revised and interagency-endorsed requirements and bridge a long-standing gap between research and development activities geared toward technology transition and the operational capabilities.

Public Law Authorizations:

- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-397, National Defense Authorization Act for Fiscal Year 2023
- P.L. 117-328, Consolidated Appropriations Act, 2023
- P.L. 117-81, National Defense Authorization Act for Fiscal Year 2022
- P.L. 117-103, Consolidated Appropriations Act, 2022

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Defense Nuclear Nonproliferation

	($K)				
	FY 2022[a] Enacted	FY 2023[b] Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Defense Nuclear Nonproliferation Appropriation	**2,354,000**	**2,490,000**	**2,508,959**	**+18,959**	**+0.8%**

Overview

The DOE/National Nuclear Security Administration's (DOE/NNSA) nonproliferation, counterproliferation, and counterterrorism activities are critical to implementing the President's *National Security Strategic Guidance* and the 2022 Nuclear Posture Review by demonstrating renewed American nonproliferation leadership. DOE/NNSA's programs help reduce the dangers posed by nuclear weapons by extending the U.S. defenses against nuclear threats far beyond its borders. These programs help prevent adversaries from acquiring nuclear weapons or weapons-usable materials, technology, and expertise; counter adversary efforts to acquire such weapons or materials; and respond to nuclear or radiological incidents and accidents domestically and abroad. DOE/NNSA shares knowledge, accrued through its long experience in managing special nuclear materials, with partners around the world to achieve its international nonproliferation and nuclear security goals. DOE/NNSA leverages the unique technical and scientific expertise that underpins the Stockpile Stewardship Program for a range of nonproliferation and counterterrorism missions, from assessing foreign weapons programs and potential terrorist devices to managing the proliferation risks posed by civil nuclear applications.

The Defense Nuclear Nonproliferation (DNN) appropriation funds seven programs in the FY 2024 Budget Request to reduce the threats of weapons of mass destruction (WMD). These programs: provide policy and technical leadership to prevent or limit the spread of WMD-related materials, technology, and expertise; develop technologies to detect nuclear proliferation; verify international agreements and arrangements; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; anticipate and detect threats and broaden DOE's role in national biodefense; ensure NEST personnel are trained and equipped to respond to all manner of nuclear and radiological incidents worldwide, including the ability to perform advanced nuclear forensics assessments; and apply a comprehensive and integrated approach to emergency management and continuity of operations to safeguard health and safety, protect the environment, and enhance the resilience of the Department and the Nation.

DOE/NNSA advances the security and safety of the U.S. through three enduring mission pillars: maintaining a safe, secure, and effective nuclear weapons stockpile; reducing the threat of nuclear proliferation and nuclear terrorism; and providing naval nuclear propulsion. As such, the DNN appropriation programs' mission is complementary to the missions of the Office of Defense Programs (DP) and the Office of Naval Reactors (NR). Together, they form the basis for providing a strong nuclear defense strategy. These activities are carried out within a dynamic global security environment, as described in DOE/NNSA's annual reports, the *Prevent, Counter, and Respond – A Strategic Plan to Reduce Global Nuclear Threats* and the *Stockpile Stewardship Management Plan.*

This global threat landscape is characterized by Russia's unprovoked further invasion of Ukraine; states with existing nuclear weapons capabilities, such as Russia and China, that continue to selectively expand and diversify their arsenals; destabilizing proliferation activities by states with emerging or latent capabilities, including Iran and the Democratic People's Republic of Korea (DPRK); and the risk of hostile non-state actors gaining access to nuclear or radioactive material that can be used for malicious purposes. There also is an increased risk stemming from the availability of nuclear and

[a] FY 2022 Enacted excludes a rescission of $282 million from project 99-D-143, Mixed Oxide Fuel Fabrication Facility, SRS
[b] FY 2023 Enacted excludes Ukraine Supplemental Appropriations totaling $161.3 M.

radioactive materials because of the global expansion of commercial nuclear power and possible spread of fuel cycle technology, increased opportunities for illicit nuclear material trafficking and sophisticated procurement networks, and technology advances (including cyber-related tools) that may shorten nuclear weapon development timelines and complicate nuclear safeguards and security missions. Additionally, the rapid development and global dispersion of emerging technologies could improve U.S. capabilities to detect and respond to proliferation or, alternatively, could be used by adversaries to lower the barriers to proliferation or enable new proliferation pathways.

One of these emerging technologies is biotechnology. While biotechnology provides enormous potential for the U.S. economy, it is a vital interest of the U.S. to prepare for, prevent, detect, respond to, and recover from biological threats, whether naturally occurring, accidental, or deliberate. The National Biodefense Strategy (NBS), the Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy, and National Security Memorandum 15 (NSM-15) on countering biological threats describe the need for leadership in science and technology in biodefense as a top national and international security priority for the U. S. Also, the NBS Implementation Plan recognizes NNSA's unique position to advance underlying capabilities that can leverage DOE Science and accelerate mission success for many stakeholder activities across the interagency. DOE/NNSA will leverage its experience with sensitive nuclear programs and its capabilities and expertise developed at the U.S. national laboratories in areas such as high-performance computing, modeling and simulation, laboratory analyses, and data analytics to advance capabilities to anticipate, detect, and mitigate biological threats and enhance biodefense.

The DNN appropriation programs – comprised of the Office of DNN, the Office of Counterterrorism and Counterproliferation (CTCP), and the Office of Emergency Operations (EO) – execute their missions in partnership with other U.S. Government agencies, most notably the Departments of State, Defense, Commerce, Justice, and Homeland Security; the Intelligence Community; and the Nuclear Regulatory Commission (NRC). Internationally, the programs have a strong and long-established partnership with the International Atomic Energy Agency (IAEA). DOE/NNSA has active program coordination mechanisms through the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, the World Customs Organization (WCO), UNSCR 1540 Committee, International Criminal Police Organization (INTERPOL), and the IAEA-hosted International Conference on Nuclear Security (ICONS).

In carrying out WMD threat reduction activities, the DNN appropriation programs depend on the scientific and technical expertise of the Department and the U.S. national laboratories, as well as the capacity for international outreach, engagement, project management, implementation, and policy expertise. DNN also relies on competencies of other elements of DOE/NNSA, such as NNSA DP; and DOE, particularly the Office of Nuclear Energy (DOE-NE), the Office of Environmental Management (DOE-EM), and the Office of Science (DOE-SC).

The major elements of the DNN appropriation account include the following:

Material Management and Minimization (M3)
M3 programs reduce and, when possible, eliminate weapons-usable nuclear material around the world to achieve permanent threat reduction. The FY 2024 Budget Request supports the conversion or shutdown of research reactors and isotope production facilities that use highly enriched uranium (HEU), the qualification of new low-enriched uranium (LEU) fuels, the support of non-HEU-based molybdenum-99 (Mo-99) production facilities in the U.S., the optimization of proliferation resistance in reactor designs, the high-assay low-enriched uranium (HALEU) recovery project, the removal and disposal of weapons-usable nuclear material, activities to disposition plutonium from the state of South Carolina, implementation of the dilute and dispose strategy for plutonium disposition, and downblending HEU.

Global Material Security (GMS)
GMS directly contributes to national security efforts to reduce global nuclear and radiological security threats. The FY 2024 Budget Request supports programs to prevent terrorists and other actors from obtaining nuclear and radioactive material to use in an improvised nuclear device (IND) or a radiological dispersal device (RDD) by working domestically and with partner countries to improve the security of vulnerable materials and facilities and to build partners' capacity to detect, disrupt, and investigate illicit trafficking of these materials. GMS works with countries in bilateral partnerships, and with multilateral partners such as the IAEA, the GICNT, the WCO, the United Nations Office on Drugs and Crime (UNODC), and INTERPOL. As part of an ongoing strategic analysis process, GMS continues to explore and integrate innovative approaches, technologies, and tools to adapt to emerging threats. GMS has and will continue to support its partners in Ukraine in

maintaining and, where possible, rebuilding their capabilities to secure nuclear and radioactive facilities and materials, and detect smuggling of these materials within Ukraine. GMS supports U.S. national security priorities to reduce global nuclear security threats and sustain access to needed peaceful applications of nuclear technology that support energy security and global health priorities.

Nonproliferation and Arms Control (NPAC)
NPAC programs contribute to standing DOE/NNSA statutory and treaty/agreement obligations and authorities, prevent nuclear and dual-use technology from being exploited or diverted by adversaries, identify emerging technologies of potential proliferation concern, and consider ways to mitigate them. NPAC programs also strengthen the international nuclear safeguards regime and the IAEA's ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance or illicit diversion of materials, reduce proliferation concerns by enabling verifiable arms reductions, and support negotiation and implementation of U.S. nonproliferation and arms control treaties and agreements, while upholding U.S. requirements for maintaining a safe, secure, and reliable nuclear weapons stockpile are met. The FY 2024 Budget Request supports IAEA and partner countries' efforts to implement international safeguards obligations, builds domestic and international capacity to implement export control obligations, supports the negotiation and implementation of agreements and associated monitoring regimes to verifiably reduce nuclear weapons and nuclear programs, continues development of the Arms Control Advancement Initiative (ACAI) including detailed planning for construction related to the high-fidelity verification user facility, and develops approaches and strategies to address emerging nonproliferation and arms control challenges and opportunities. NPAC provides export control and safeguards training to Ukraine to promote safeguards implementation and strengthen its national export control systems to help prevent illicit trafficking in nuclear and WMD-related materials, commodities, and technology.

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
DNN R&D directly contributes to nuclear security by developing U.S. capabilities to detect and characterize global nuclear security threats in full coordination with the goals and priorities of U.S. Government mission stakeholders across nonproliferation, counterterrorism, and emergency response mission areas. In addition, DNN R&D sustains and develops foundational nonproliferation technical capabilities that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats. To achieve its goals, DNN R&D leverages the unique facilities and scientific skills of DOE, academia, and industry to perform research and demonstrate advances in capabilities, develop prototypes, and produce sensors for integration into operational systems. The FY 2024 Budget Request supports planned activities for the early detection of proliferation-related R&D and continued production of nuclear detonation detection satellite payloads. The request also supports continued efforts to sustain and develop foundational nonproliferation technical capabilities by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce. Additionally, it continues to develop and maintain advanced technical nuclear forensics analysis capabilities at the U.S. national laboratories that can support time-critical decisions in the event of a nuclear or radiological incident and assist in determining the origin of interdicted materials or nuclear devices.

DOE/NNSA Bioassurance Program
The DOE/NNSA Bioassurance Program develops U.S. national laboratory capabilities to anticipate, detect, assess, and mitigate emerging biothreats and strengthen biodefense. The program develops core capabilities at the U.S. national laboratories, such as high-performance computing for accelerated threat assessment and rapid countermeasure design, surveillance and detection capabilities, safeguards and export controls, and forensics to support attribution. The Bioassurance program uniquely provides long-term capability stewardship that enables other departments and agencies in biodefense to satisfy their own, agency-specific mission requirements, as part of the overall strategically guided effort. The FY 2024 Budget Request develops the initial operating capability and coordinated DOE program in biosciences, including phased science plan implementation with exploratory research, facility upgrades, and minor equipment purchases.

Nonproliferation Construction
Nonproliferation Construction consolidates construction costs for DNN projects. Currently, one project that will support the dilute and dispose strategy for surplus plutonium disposition resides within the Material Management and Minimization program. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the Savannah River Site to accelerate plutonium dilution and aid in the removal of plutonium from the state of South Carolina. The FY 2024 Budget Request supports completing the final design review and activities to request CD-2/3, *Approval of Performance Baseline and Start of Construction*, to initiate full construction on the SPD project.

Nuclear Counterterrorism and Incident Response Program (NCTIR)
The NCTIR program sustains the U.S. nuclear counterterrorism and counterproliferation activities as well as operational nuclear incident response capabilities while supporting DOE's all-hazards emergency management system. The CTCP subprogram provides the Nation's technical capability to understand and defeat nuclear devices, including INDs and lost or stolen foreign nuclear weapons. This knowledge in turn informs U.S. Government policies, regulations, and key Department of Defense (DoD) mission partners on terrorist and proliferant state nuclear threats and related contingency planning. In support of the nuclear counterterrorism mission, the FY 2024 Budget Request for NCTIR supports programs to manage and deploy the DOE/NNSA NEST, comprised of scientific and technical experts who are trained and equipped to respond rapidly to nuclear or radiological incidents and accidents worldwide. NEST includes scientific nuclear forensics capabilities which support identifying the origin of nuclear material interdicted outside of regulatory control or used in a nuclear attack. Additionally, CTCP educates international partners to respond effectively to nuclear or radiological incidents in their countries. Finally, CTCP integrates DOE/NNSA policy, planning, and operations on counterproliferation priorities, supporting urgent needs, and proactively pursuing opportunities to prevent nuclear threats and develop technologies to apply to the counterproliferation mission.

Additionally, NCTIR funds the EO subprogram. The EO subprogram provides the structure and processes to support a comprehensive and integrated approach to all-hazards emergency management. The EO subprogram improves the readiness and effectiveness of the DOE Emergency Management System and the Nuclear Security Enterprise (NSE) on a programmatic and performance level to deal with all types of emergencies impacting the DOE/NNSA enterprise or its equities anywhere in the world. This promotes unity of effort and a culture of continuous improvement to safeguard the health and safety of workers and the public, protect the environment, and enhance the resilience of the Department and the Nation.

Highlights and Major Changes in the FY 2024 Budget

FY 2024 request includes:
- $2.013 billion for DNN programs, a decrease of 3.6% from the FY 2023 Enacted level. The decrease reflects the judicious use of carryover to fund FY 2024 activities, as well as a change to the methodology for funding work at Savannah River National Laboratory.
- $493.5 million for the National Counterterrorism and Incident Response (NCTIR), an increase of $23.6 million or 5.0% from the FY 2023 Enacted level. This increase provides additional NIR/NEST capacity for emergency response incidents and interagency partner technical training, with a particular focus on lessons-learned from the Ukraine crisis and related activities. In addition, this increase allows NTNF to progress toward meeting newly revised and interagency-endorsed requirements and bridge a long-standing gap between research and development activities geared toward technology transition and the operational capabilities, as well as make infrastructure improvements. The increase to the CTCP program is partially offset by a decrease to the EO subprogram, which decreases by $10.8 million or 36% from the FY 2023 Enacted level. This is due to the completion of some aspects of the Consolidated Emergency Operations Center renovation in FY 2023, as well as one-time investments in alternate operations centers' infrastructure and supporting communications equipment, and classified communications system improvements.
- $22.6 million for Legacy Contractor Pensions and Settlement Payments, a -$33.1 million or 59.5% decrease from the FY 2023 Enacted level reflects reduced requirements for both the University of California and Savannah River Site direct pension payments.

FY 2025 – FY 2028 Key Milestones

<u>Material Management and Minimization</u>
- FY 2025 – FY 2028 – Pack and deliver scrap material from Y-12 to a domestic commercial processor and produce limited quantities of HALEU.
- FY 2025 – FY 2028 – Convert research reactors from the use of HEU fuel to LEU fuel or verify the shutdown of HEU fueled research reactors.

- FY 2025 – FY 2028 – Deliver HALEU to domestic Mo-99 producers as needed under the Uranium Lease and Take-Back (ULTB) program.
- FY 2025 – FY 2028 – Collaborate with international partners to increase proliferation resistance in new research reactor designs.
- FY 2025 – FY 2028 – Eliminate excess HEU and plutonium globally.
- FY 2025 – Initiate hiring, training, and qualification for operators for the SPD Project gloveboxes.
- FY 2025 – Achieve Approval of Alternative Selection and Cost Range Critical Decision, CD-1, for the Pit Disassembly and Processing (PDP) project.
- FY 2025 – Complete excess HEU shipment from Y-12 included in the Down-blending Offering for Tritium (DBOT).
- FY 2026 – Conduct a full-scale training exercise of the Mobile Packaging capabilities.
- FY 2027 – Submit application to the NRC for the qualification of high-density LEU fuel for the U.S. High Performance Research Reactors.
- FY 2028 – Conduct a full-scale training exercise of the Mobile Packaging capabilities.

Office of Global Material Security
- FY 2025 – Complete nuclear security upgrades in seven countries in high-threat environments.
- FY 2025 – Deepen long-term nuclear security partnerships with over 60 countries.
- FY 2025 – Expand counter nuclear smuggling partnerships to at least five countries in Africa, and to three countries in South/Southeast Asia to create layered defenses to disrupt smuggling activity.
- FY 2025 – Support 80% of partner agencies to demonstrate independent operational capability of systems to counter nuclear smuggling.
- FY 2026 – Deploy counter nuclear smuggling systems to frontier areas and law enforcement partners in at least 15 partner countries to complement point of entry deployments and create layered defenses against smuggling activity.
- FY 2026 – Establish counter nuclear smuggling capability and technical cooperation with 95 countries.
- FY 2025 – FY 2028 – Replace 260 devices that use radioactive material with alternatives that pose no RDD risk.
- FY 2025 – FY 2028 – Protect an additional 120 buildings that contain radioactive material.
- FY 2028 – Meet the goal, as outlined in the 2019 National Defense Authorization Act (NDAA), of replacing nearly all Cesium-137 blood irradiators in the United States.

Nonproliferation and Arms Control
- FY 2025 – FY 2028 – Maintain technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through regular verification team exercise and training events, approximately four per year.
- FY 2025 – FY 2028 – Conduct approximately 80 training and outreach events, annually, for U.S. enforcement agencies and foreign partners to strengthen global export control implementation.
- FY 2025 – FY 2028 – Support U.S. Government nonproliferation objectives in the multilateral regimes through review of technical proposals strengthening the guidelines and control lists, and review IAEA Technical Cooperation projects for proliferation and export control issues.
- FY 2025 – FY 2028 – Complete construction related to the high-fidelity verification user facility.
- FY 2025 – FY 2028 – Complete the negotiations of eight 123 Agreements and their associated Administrative Arrangements.

Defense Nuclear Nonproliferation Research and Development
- FY 2025 – FY 2028 – Conduct multiple experimental field campaigns for nuclear material production detection.
- FY 2025 – Achieve fully operational uranium sciences capability with optimized material science, computational science, and advanced enrichment methods capabilities that address evolving nuclear threats.
- FY 2025 – Conduct uranium and plutonium processing experiments to study material provenance signatures.
- FY 2026 – Delivering the six Global Burst Detector payload to the USSF for integration on GPS block IIIF satellites
- FY 2026 – Award new university consortia focused on nuclear nonproliferation and nuclear engineering.
- FY 2028 – Conclude first phase of integrated field experiments at the Low-Yield Nuclear Monitoring testbed, designed to improve U.S. capabilities to detect and characterize low-yield and evasively conducted underground nuclear explosions.

NNSA Bioassurance Program

- FY 2025 – Execute first R&D cycle based on FY 2025-2029 Technical Roadmap
- FY 2026 – Demonstrate capabilities to evaluate and anticipate threats from emerging and converging technologies.

Nuclear Counterterrorism and Incident Response Program (NCTIR)

- FY 2025 – FY 2028 – Perform NEST equipment modernization to enable responses to radiological/nuclear incidents.
- FY 2025 – FY 2028 – Enhance interagency coordination of training, exercises, and response operations to improve NEST capabilities.
- FY 2025 – FY 2028 – Sustain standardized NEST technical training to FBI regional render safe teams and field offices.
- FY 2025 – FY 2028 – Ensure that the Federal Radiological Modeling and Assessment Center has the capacity to respond to moderate scale and complexity events (i.e., radiological dispersal devices) with trained and qualified NEST personnel, while exploring alternative pathways to sustain the required capacity for large and highly complex events (i.e., continuous radiation release from a nuclear power plant).
- FY 2025 – FY 2028 – Validate the increase in the Federal Radiological Modeling and Assessment Center response capacity to better support large or complex events (i.e., Type 1 responses, such as continuous radiation release from a nuclear power plant).
- FY 2025 – FY 2028 – Certify improvements to the National Atmospheric Release Advisory Center’s modeling capabilities to meet maximum demands for real-world responses.
- FY 2025 – FY 2028 – Deliver enhanced Accident Response Group support to Ministry of Defence (MOD) changeouts, including builds of high-fidelity training devices.
- FY 2025 – FY 2028 – Provide expanded technical and policy solutions to the U.S. Government’s counterproliferation toolkit to disrupt global nuclear proliferation.
- FY 2025 – FY 2028 – Execute integrated experiments to validate risk assessments of nuclear materials and threat devices.
- FY 2025 – Advance the technical and operational capabilities that support Design Heritage assessments for attributing origin of a device and material used in an attack.
- FY 2025 – FY 2028 – Complete development and field new nuclear forensics capabilities to accelerate attribution timeliness: perform high confidence in-field measurements of short-lived isotopes; increase prompt collection capabilities to better characterize an initial blast in minutes rather than days; improve air and ground debris collection to increase coverage, collect more robust samples, and shorten attribution timelines; and improve laboratory capability to perform more discriminating measurements in shorter timelines.
- FY 2025 – FY 2028 – Complete analysis of RDD experiment results to improve threat response.
- FY 2025 – FY 2028 – Refine, implement, and track progress against the NA-40 Strategic Plan, aligning all NA-40 activities with overarching DOE/NNSA mission priorities.
- FY 2025 – FY 2028 – Integrate the Federal Mission Resilience Strategy (FMRS), to include a viable Devolution capability, into Departmental day-to-day operations and maintaining continued interoperability of required continuity communications systems across DOE/NNSA and with interagency partners.
- FY 2025 – FY 2028 – Leading, managing, and operating the DOE/NNSA Consolidated Emergency Operations Center (CEOC), improving integration of, and coordination with, the various DOE and DOE/NNSA operations centers and the interagency, to include growing our internal capacity to provide operative emergency management support, and distributing staffing to a geographically resilient operations center capable of providing extended operational support by FY 2028.
- FY 2025 – FY 2028 – Enhancing the DOE/NNSA CEOC to address known capability gaps to meet the needs of Senior Leaders in an evolving landscape of sophisticated adversaries and escalating all-hazard threats.
- FY 2025 – FY 2028 – Updating and validating emergency management and continuity directives, guides, and technical planning basis standards, including DOE Orders 150.1 and 151.1 by FY 2026.
- FY 2025 – FY 2028 – Compile and promulgate the annual readiness assurance report regarding the Department’s Emergency Management System, to include achieving Full Operational Capability of the Emergency Management Readiness Assurance Reporting Dashboard and conduct of biennial site visits at all participating U.S. national laboratories, Plants, Sites, and Offices by FY 2025.

- FY 2026 – Design, develop, and execute DOE's participation within the National Level Exercise (NLE) on a biennial basis, to include NLE 2024 and NLE 2026, and the annual Eagle Horizon exercise.
- FY 2025 – FY 2028 – Support DOE and DOE/NNSA risk management and worker safety policy efforts, to include development, updating, and distribution annually of an Enterprise Threat and Hazard Risk Profile, and through the hosting of the 38th-41st annual emergency management-based forums to enhance collaboration, issue resolution, and enhancement of all-hazards preparedness, prevention, mitigation, response, and recovery across the Department.

The Defense Nuclear Nonproliferation appropriation FY 2024 Budget Request supports the following **key priorities**:

DNN Programs
- Convert and/or verify the shutdown of one research reactor and isotope production facility.
- Eliminate excess HEU and plutonium, including removing and/or confirming the disposition of 10 kilograms of material.
- Disposition plutonium from the state of South Carolina and pursue the dilute and dispose strategy to dispose of 34 metric tons of plutonium.
- Conduct studies for pit disassembly and processing expansion.
- Eliminate surplus HEU by downblending it to LEU, or through direct disposal with a priority on legacy material to reduce operating risk in deteriorating infrastructure.
- Complete final design to support Critical Decision (CD) – 2/3, Approve Performance Baseline/Approve Start of Construction, for the SPD Project.
- Sustain and build upon previous upgrades at nuclear facilities and reduce the risk of sabotage at facilities in key locations and engage bilaterally and regionally with partners on nuclear security topics, including insider threat mitigation, cyber security, transportation security, nuclear material control and accounting, physical security, and emergent technologies.
- Develop additional tools, technologies, modeling, simulation, and analytical methods to support security analyses of advanced reactor classes; engage in technical partnerships with industry on Security-by-Design for advanced reactors for future global deployments; and expand engagements with nuclear newcomer countries on nuclear security infrastructure development, in support of sustainable energy goals.
- Secure buildings with high-priority radioactive sources.
- Promote and facilitate the adoption of viable alternative technologies that do not use high-activity radioactive sources with a focus on replacement of cesium and cobalt devices.
- Enhance capabilities to manage disused sources safely and securely and build international partner capacity to manage disused sources themselves.
- Deploy and support sustainable counter nuclear smuggling solutions to detect, disrupt, and investigate the illicit trafficking of nuclear and radioactive material through critical pathways.
- Provide critical mission support to the IAEA, including strengthening the international nuclear safeguards system and supporting its expanding nuclear security activities, regional and international training courses on topics such as advanced insider and computer security; strengthening training capabilities and helping develop guidance documents; and promoting security best practices to nuclear newcomers.
- Continue implementation of Advanced Reactor International Safeguards Engagement (ARISE) program, including working with key stakeholders to incorporate Safeguards-by-Design elements into advanced reactor designs.
- Implement a monitoring and verification initiative (i.e., ACAI) to develop the needed DOE/NNSA facilities, projects, and personnel to bolster the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches. This includes detailed planning for construction related to the high-fidelity verification user facility.
- Facilitate U.S. trade by providing roughly 6,000 technical reviews of U.S. export license applications, and technical support and training to U.S. law enforcement to help prevent the exploitation of the U.S. industrial base.
- Work with over 30 international partners to build global export control capacity through training, technical exchanges, and train-the-trainer approaches.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges.
- Develop policy and technical solutions for, and support the implementation of, arms control and nonproliferation treaties, agreements, and on-site denuclearization monitoring and verification activities.
- Demonstrate new U.S. capabilities for detecting foreign material and weapons production processes.

- Demonstrate new capabilities for weapons and material security applications, including detecting special nuclear material movement and diversion and nuclear safeguards.
- Sustain and improve U.S. nuclear explosion monitoring capabilities, including delivering the Nation's space-based nuclear detonation detection payloads and related activities that support treaty monitoring and military missions.
- Sustain and develop foundational nonproliferation technical capabilities that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats.
- Advance technical nuclear forensics analysis capabilities that support the U.S. Government response to a nuclear event, with an emphasis on advancing timelines to support attribution and novel approaches to material provenance.
- Develop a bioassurance capability for anticipating destabilizing bio threats and avoiding technical surprise through predictive modeling and data science, for identifying threat signatures, and for developing detection technologies, and for developing and validating safeguards and threat mitigation approaches.

NCTIR Program

- Enhance capabilities to counter nuclear and radiological threats—including improved tools to locate, characterize, defeat, and conduct forensics on these threats.
- Sustain training and maintain equipment for regional and national response capabilities to respond to WMD terrorism threats, including the sustainment of enhanced counter weapons of mass destruction capability in 14 major U.S. cities.
- Begin the second phase of the Capability Forward initiative by developing a standardized NEST technical training program to be delivered to FBI field office responders, focused on actions to Secure and Defeat WMD Devices.
- Detect, measure, and track radioactive material in an emergency to determine contamination levels through the Aerial Measuring System.
- Provide security and assessment capabilities for non-stockpile nuclear threat device designs, including INDs.
- Implement training, develop, and validate tools, and maintain expertise for DOE/NNSA, DoD, and Federal Bureau of Investigation (FBI) counterterrorism, counterproliferation, and contingency planning efforts.
- Continue to evaluate technologies for counterterrorism and counterproliferation applications.
- Lead coordination of the government agencies supporting response and assessment for technical nuclear forensics.
- Advance nuclear forensics capabilities that can significantly improve time-critical decision support, improving attribution timeliness.
- Enhance technical nuclear forensics capabilities by leveraging expertise from the national laboratories to analyze and determine the origin of interdicted nuclear materials and nuclear devices, and in the case of a nuclear attack, the device design and origin of the nuclear materials used.
- Identify, prioritize, analyze, and characterize historical nuclear material samples of value to the technical nuclear forensics program through the National Nuclear Material Archive (NNMA) within DOE/NNSA.
- Enhance domestic and international engagements on nuclear counterterrorism and emergency preparedness and response, improving strategic communications, medical response competencies, and technical capabilities of public health, law enforcement, and emergency management authorities before, during and after a nuclear or radiological incident or accident.
- Develop and deliver training events focusing on nuclear counterterrorism and emergency preparedness and response combining virtual and in-person instruction methods to maximize the benefits of each method and increase the reach and impact of the program.
- Advance Emergency Management training, exercise, and certification programs.
- Serve as the focal point of the DOE and DOE/NNSA Continuity Programs and higher-level continuity programs, assisting the Secretary of Energy, DOE/NNSA Administrator, and their staffs or higher designated officials, in executing the National Continuity Policy.
- Lead, manage, and operate the DOE/NNSA Consolidated Emergency Operations Center 24/7/365.
- Mature the Emergency Management Readiness Assurance Reporting Program.
- Lead the design and development of the DOE National Level Exercise, to include Eagle Horizon 2024.
- Institutionalize the FMRS, to include a viable Devolution capability.
- Ensure and improve interoperability of continuity communications systems across DOE/NNSA and with interagency partners.
- Update and validate emergency management and continuity directives, guides, and technical planning basis standards.
- Enhance the security and resilience of the Department and Nation.

DOE Working Capital Fund (WCF) Support
The DOE/NNSA DNN appropriation projected contribution to the DOE WCF for FY 2024 is $4,396,000. This funding covers shared enterprise activities including managing enterprise-wide systems and data, telecommunications, and supporting the integrated acquisition environment.

Legacy Contractor Pensions and Settlement Payments
This budget line includes funding for the Requa settlement reached in 2019 as well as a portion of an unfunded pension liability at the Savannah River Site in addition to DOE's annual reimbursement made to the University of California (UC) Retirement Plan (UCRP) for former UC employees and annuitants who worked at the Lawrence Livermore National Laboratory (LLNL) and Los Alamos National Laboratory (LANL).

The *Requa* lawsuit involved UC employees of LLNL who retired prior to the Laboratory's transition to a new contractor on October 1, 2007. The retirees had been receiving health insurance through a UC health plan but when the LLNL contract transitioned to LLNS, the employees were offered health insurance through the new LLNL contractor, leading the retirees to file a lawsuit seeking reinstatement into the UC health plan. The parties settled the lawsuit in 2019, and a final judgment was issued in April 2020. DOE/NNSA agreed, pursuant to the legacy UC-LLNL Contract, to provide UC a portion of the total costs to settle the lawsuit, over a period of seven years through FY 2026. DOE/NNSA's responsibility for FY 2024 is $9 million.

Funding is also requested for reimbursement of NNSA's portion of the unfunded liability of the Savannah River Nuclear Solutions pensions plan. The NNSA FY 2024 Request includes up to $43.9 million for this liability; NNSA's portion is allocated between the DNN and Weapons Activities appropriation accounts.

This budget line also continues to include the DNN share of the DOE's annual reimbursement made to the UC Retirement Plan (UCRP) for former UC employees and annuitants who worked at the LLNL and LANL. The annual reimbursement is based on the actuarial valuation report and an annual assessment provided by UC and is covered by the terms described in the contracts. These contracts are paid through the Legacy Contractor Pensions and Settlement Payments line item.

The DNN share of these costs in the FY 2024 Budget is $29,874,000.

Entry Level Hires
DOE/NNSA supports a variety of programs to help train and recruit the next generation of leaders in managing the nuclear stockpile, nonproliferation, nuclear security, and international security, such as the NNSA Graduate Fellowship Program (NGFP), and, where appropriate, the Presidential Management Fellows (PMF) program. These programs foster the pipeline of qualified professionals who will sustain expertise in these areas through future employment within the nuclear security enterprise. In FY 2024, the DNN appropriation projects providing $3.3 million for NGFP support and development activities.

Defense Nuclear Nonproliferation
Funding by Congressional Control

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Defense Nuclear Nonproliferation Appropriation					
Defense Nuclear Nonproliferation					
Material Management and Minimization					
Conversion	**100,660**	**153,260**	**116,675**	**-36,585**	**-23.9%**
Nuclear Material Removal	**42,100**	**55,000**	**47,100**	**-7,900**	**-14.4%**
Material Disposition	**200,186**	**256,025**	**282,250**	**+26,225**	**+10.2%**
Total, Material Management and Minimization	**342,946**	**464,285**	**446,025**	**-18,260**	**-3.9%**
Global Material Security					
International Nuclear Security	**79,939**	**87,763**	**84,707**	**-3,056**	**-3.5%**
Radiological Security	**253,002**	**260,000**	**258,033**	**-1,967**	**-0.8%**
Nuclear Smuggling Detection	**198,500**	**185,000**	**181,308**	**-3,692**	**-2.0%**
Total, Global Material Security	**531,441**	**532,763**	**524,048**	**-8,715**	**-1.6%**
Nonproliferation and Arms Control	**184,795**	**230,656**	**212,358**	**-18,298**	**-7.9%**
Defense Nuclear Nonproliferation R&D					
Proliferation Detection	**269,407**	**299,283**	**290,388**	**-8,895**	**-3.0%**
Nuclear Detonation Detection	**294,500**	**279,205**	**285,603**	**+6,398**	**+2.3%**
Nonproliferation Fuels Development	**20,000**	**20,000**	**0**	**-20,000**	**-100.0%**
Forensics R&D	**45,000**	**44,414**	**44,759**	**+345**	**+0.8%**
Nonproliferation Stewardship Program	**100,329**	**125,000**	**107,437**	**-17,563**	**-14.1%**
Total, Defense Nuclear Nonproliferation R&D	**729,236**	**767,902**	**728,187**	**-39,715**	**-5.2%**
NNSA Bioassurance Program	**0**	**20,000**	**25,000**	**+5,000**	**+25.0%**
Nonproliferation Construction					
18-D-150, Surplus Plutonium Disposition Project	**156,000**	**71,764**	**77,211**	**+5,447**	**+7.6%**
Total, Nonproliferation Construction	**156,000**	**71,764**	**77,211**	**+5,447**	**+7.6%**
Total, Defense Nuclear Nonproliferation Programs	**1,944,418**	**2,087,370**	**2,012,829**	**-74,541**	**-3.6%**

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
	($K)				
Nuclear Counterterrorism Incident Response Program					
Emergency Operations	**14,597**	**29,896**	**19,123**	**-10,773**	**-36.0%**
Counterterrorism and Counterproliferation	**356,185**	**440,074**	**474,420**	**+34,346**	**+7.8%**
Total, Nuclear Counterterrorism Incident Response Program	**370,782**	**469,970**	**493,543**	**+23,573**	**+5.0%**
Legacy Contractor Pensions	**38,800**	**55,708**	**22,587**	**-33,121**	**-59.5%**
Subtotal, Defense Nuclear Nonproliferation Appropriation	**2,354,000**	**2,613,048**	**2,528,959**	**-84,089**	**-3.2%**
Use of Prior Year Balances	**0**	**-123,048**	**-20,000**	**+103,048**	**-84%**
Total, Defense Nuclear Nonproliferation Appropriation	**2,354,000**	**2,490,000**	**2,508,959**	**+18,959**	**+0.8%**
Rescission	**-282,133**				
Ukraine Supplemental Appropriations Act 2023	0	35,000			
Additional Ukraine Supplemental Appropriations Act 2023	0	126,300			

Small Business Innovation Research (SBIR)/ Small Business Technology Transfer (STTR):

- FY 2022 Enacted: SBIR 14,785; STTR: $0
- FY 2023 Enacted: SBIR: $14,735; STTR: $0
- FY 2024 Request: SBIR: $13,972; STTR: $0

Funding by Congressional Control
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Defense Nuclear Nonproliferation Appropriation				
Defense Nuclear Nonproliferation				
Material Management and Minimization				
Conversion	**118,664**	**104,895**	**97,356**	**83,647**
Nuclear Material Removal	**31,496**	**32,866**	**33,816**	**36,750**
Material Disposition	**290,233**	**276,941**	**294,765**	**333,951**
Total, Material Management and Minimization	**440,393**	**414,702**	**425,937**	**454,348**
Global Material Security				
International Nuclear Security	**90,768**	**89,433**	**86,093**	**86,710**
Radiological Security	**281,080**	**263,118**	**265,009**	**267,902**
Nuclear Smuggling Detection	**188,016**	**189,481**	**192,704**	**193,067**
Total, Global Material Security	**559,864**	**542,032**	**543,806**	**547,679**
Nonproliferation and Arms Control	**226,980**	**230,568**	**232,435**	**231,906**
Defense Nuclear Nonproliferation R&D				
Proliferation Detection	**305,158**	**307,319**	**307,079**	**309,075**
Nuclear Detonation Detection	**304,058**	**321,312**	**311,192**	**308,288**
Nonproliferation Fuels Development	**0**	**0**	**0**	**0**
Forensics R&D	**47,106**	**47,463**	**45,439**	**45,770**
Nonproliferation Stewardship Program	**102,128**	**101,856**	**104,799**	**105,474**
Total, Defense Nuclear Nonproliferation R&D	**758,450**	**777,950**	**768,509**	**768,607**
NNSA Bioassurance Program	**30,000**	**35,000**	**40,000**	**50,144**
Nonproliferation Construction				
18-D-150, Surplus Plutonium Disposition Project	**53,080**	**65,000**	**60,672**	**26,202**
25-D-XXX, Pit Disassembly and Processing (PDP) Project	**49,164**	**156,122**	**243,328**	**259,798**
Total, Nonproliferation Construction	**102,244**	**221,122**	**304,000**	**286,000**
Total, Defense Nuclear Nonproliferation Programs	**2,117,931**	**2,221,374**	**2,314,687**	**2,338,684**
Nuclear Counterterrorism and Incident Response Program				
Emergency Operations	20,683	20,975	21,718	21,902
Counterterrorism and Counterproliferation	505,592	522,545	537,137	551,422
Total, Nuclear Counterterrorism and Incident Response Program	**526,275**	**543,520**	**558,855**	**573,324**
Legacy Contractor Pensions and Settlement Payments	16,296	20,993	14,128	14,368
Total, Defense Nuclear Nonproliferation Appropriation	**2,660,502**	**2,785,887**	**2,887,670**	**2,926,376**

Research and Development

The Office of Management and Budget (OMB) Circular No. A-11, "Preparation, Submission, and Execution of the Budget," requires the reporting of research and development (R&D) data. Consistent with this requirement, R&D activities funded by DOE/NNSA DNN programs are displayed below.

	($K)				
	FY 2022 Enacted	FY 2023 Enaced	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Research and Development (R&D)					
Basic	161,165	180,633	169,889	(10,744)	-7%
Applied	193,973	205,570	193,967	(11,603)	-6%
Development	133,285	129,361	139,121	9,760	7%
Subtotal, R&D	**488,423**	**515,564**	**502,977**	**-12,587**	**-3%**
Equipment	30,396	31,339	32,228	889	3%
Construction	0	0	0	0	0%
Total, R&D	**518,819**	**546,903**	**535,205**	**-11,698**	**-2%**

Material Management and Minimization

Overview

The Material Management and Minimization (M3) program aims to reduce and, when possible, eliminate nuclear materials and provide sound management principles for materials that remain. This includes minimizing the civilian use and production of highly enriched uranium (HEU) and plutonium; removing or eliminating nuclear material internationally; and disposing of excess nuclear material in the U.S. The M3 Budget Request presents an integrated approach to addressing the persistent threat posed by the global stockpile of nuclear materials.

M3 directly contributes to, and plays a critical role in, reducing global nuclear security threats and promoting U.S. national security. M3 makes these strategic contributions through the conversion of research reactors and medical isotope production facilities to use non-weapons-usable nuclear material, the optimization of proliferation resistance in reactor designs, the removal of excess HEU and separated plutonium, and the disposition of HEU and plutonium. The M3 program is a key component of the Department of Energy/National Nuclear Security Administration (DOE/NNSA) integrated nonproliferation, counterterrorism, and emergency response strategies.

Material Management and Minimization
Funding[a]

($K)	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Material Management and Minimization					
Conversion	**100,660**	**153,260**	**116,675**	**-36,585**	**-23.9%**
Nuclear Material Removal	**42,100**	**55,000**	**47,100**	**-7,900**	**-14.4%**
Material Disposition	**200,186**	**256,025**	**282,250**	**+26,225**	**+10.2%**
Total, Material Management and Minimization	**342,946**	**464,285**	**446,025**	**-18,260**	**-3.9%**

Material Management and Minimization
Outyear Funding

($K)	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Material Management and Minimization				
Conversion	**118,664**	**104,895**	**97,356**	**83,647**
Nuclear Material Removal	**31,496**	**32,866**	**33,816**	**36,750**
Material Disposition	**290,233**	**276,941**	**294,765**	**333,951**
Total, Material Management and Minimization	**440,393**	**414,702**	**425,937**	**454,348**

[a] The international contributions received by the M3 program in Fiscal Year (FY) 2022 totaled $1,969,437.48 from Canada.

Material Management and Minimization
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Material Management and Minimization	
Conversion: Decrease reflects the availability of sufficient prior year uncosted balances necessary to execute the planned FY 2024 level of effort. New funding requested, plus the use of prior year uncosted balances will support: qualifying and fabricating high-density low-enriched uranium (LEU) fuels to convert U.S. high performance research reactors (USHPRRs); converting and/or verifying the shutdown of research reactor facilities; implementing pilot projects for the Proliferation Resistance Optimization (PRO-X) program; recovering high-assay low-enriched uranium (HALEU) scrap from Y-12 in cooperation with a domestic commercial entity; and providing laboratory expertise to support commercial partners in deploying non-HEU based Molybdenum-99 (Mo-99) technologies in the U.S.	**-36,585**
Nuclear Material Removal: Decrease reflects the availability of sufficient prior year uncosted balances necessary to maintain the planned FY 2024 level of effort. New funding requested plus the use of prior year uncosted balances will support removing or confirming the disposition of weapons-usable nuclear material; continuing construction of the Mobile Melt-Consolidate (MMC) system 2.0 that started in FY 2023; executing a large-scale training exercise of the Mobile Uranium Facility (MUF) and Mobile Plutonium Facility (MPF); and supporting the repatriation of HALEU from a partner country.	**-7,900**
Material Disposition: The increase supports the activities associated with the removal of plutonium from the state of South Carolina, activities to ramp up the dilute and dispose mission, including conducting studies on additional oxide production capability; and increasing the number of regular shipments of downblended Pu to the Waste Isolation Pilot Plant (WIPP).	**+26,225**
Total, Material Management and Minimization	**-18,260**

Material Management and Minimization
Conversion

Description

The Conversion subprogram, referred to as the Convert subprogram, will support the implementation of key international nuclear nonproliferation activities addressing HEU and/or plutonium minimization. The Convert subprogram supports the conversion of domestic and international civilian research reactors and isotope production facilities to use non-weapons-usable nuclear materials. These efforts result in permanent threat reduction by minimizing and, to the extent possible, eliminating the use of HEU in civilian applications.

Currently, the Convert subprogram has converted or verified the shutdown of 108 HEU research reactors and isotope production facilities worldwide. In support of this effort, Convert is working to qualify high-density LEU fuels and to demonstrate and set up the fabrication capability necessary to convert six USHPRRs from HEU to LEU fuel. The Convert subprogram also is working to convert and verify the shutdown of HEU-fueled reactors around the world, including providing technical support for the European Fuel Development program. Funding will support the development and implementation of the PRO-X program, where the subprogram will identify and work with partners around the world on the design of new-build research reactors, and associated facilities, to explore technical options to reduce the ability for these facilities to be misused for proliferation purposes.

Given the significant progress by M3 supporting the advancement of non-HEU based Mo-99 production facilities in the U.S., the program is not requesting additional Cooperative Agreement (CA) funding. However, prior year and new funding will be used to conduct technical work at the U.S. national laboratories to support domestic Mo-99 commercial entities. With U.S. companies transitioning into production, there will be a reduced need for laboratory technical support in FY 2024 compared to prior FYs. The Convert subprogram uses prior-year CA funding to further the development of several diverse non-HEU technologies and construction of domestic facilities for Mo-99 production. The last major global Mo-99 producer will finish conversion to 100 percent LEU-based Mo-99 production in FY 2023, ending the need for the Convert subprogram’s assistance in converting international Mo-99 facilities from using HEU to LEU targets.

Additionally, the Convert subprogram supports DOE and DOE/NNSA’s HALEU supply and uranium enrichment initiatives. The Convert subprogram identified 2.2 metric tons of HALEU scrap material at Y-12 that will be packaged and shipped to BWX Technologies (BWXT) for processing into a usable form. Approximately 375 kilograms of additional HALEU material already located at BWXT will also be processed. This project will support the Y-12 transition to the Uranium Processing Facility (UPF) by clearing material out of Y-12’s Building 9212 and enable the U.S. to make HALEU available for future conversions and new reactor builds.

Highlights of the FY 2024 Budget Request

- Convert research reactors from the use of HEU fuel to LEU fuel, or verify the shutdown of HEU fueled research reactors, both domestically and internationally. One facility will be converted or verified as shutdown in FY 2024.
- Conduct several irradiation experiments to support qualifying first-of-a-kind high-density LEU fuels.
- Provide technical support from the U.S. national laboratories to domestic Mo-99 commercial entities to establish a reliable commercial supply of Mo-99 produced without HEU.
- Pack and deliver scrap material from Y-12 to BWXT and produce limited quantities of HALEU.
- Collaborate on increasing proliferation resistance in new research reactor designs and further define measurable metrics in proliferation optimization.

FY 2022 Accomplishments

- Given travel constraints related to COVID-19, held more than 100 virtual exchanges with over 10 bilateral partners and the International Atomic Energy Agency (IAEA) on a range of HEU minimization issues, including conversion of Mo-99 and research reactor facilities, proliferation resistance, and LEU fuel qualification efforts.
- Converted the IVG.1M research reactor in Kazakhstan to LEU fuel, bringing the lifetime program total to 108 facilities converted or shutdown.

- Triggered ban on exports of HEU for foreign medical isotope production through a joint Secretarial certification of sufficient worldwide supply of the medical isotope Mo-99 made without using HEU to meet the needs of patients in the U.S.
- Completed the USHPRR program's mini-plate (MP)-1 post-irradiation examination activities and produced final report that documents the suitable irradiation performance of first-of-a-kind- HALEU research reactor fuel produced by the commercial fabricator.
- Developed a research reactor core optimization model that minimizes production of weapons usable material and opportunities for misuse, while increasing research reactor performance and improving fuel utilization.

Conversion

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Conversion $153,260,000	**Conversion $116,675,000**	**Conversion -$36,585,000**
• Conduct activities to support converting or verifying the shutdown of one facility. • Conduct HALEU fuel qualification and fabrication activities for research reactors both domestically and internationally. • Support DOE's and DOE/NNSA's HALEU supply initiatives. • Pack and ship material from Y-12 to BWXT and begin production of limited quantities of HALEU. • Provide technical support to the U.S. private sector to support establishment of a reliable domestic production capability for Mo-99 without the use of HEU. • Conduct PRO-X activities addressing HEU and/or plutonium to reduce the risk of potential misuse or production of weapons-usable material. • Implement the Uranium Lease and Take Back (ULTB) program.	• Conduct activities to convert or verify the shutdown of one facility. • Conduct HALEU fuel qualification and fabrication activities for research reactors both domestically and internationally. • Support DOE's and DOE/NNSA's HALEU supply initiatives. • Pack and ship material from Y-12 to BWXT and produce limited quantities of HALEU. • Provide technical support to the U.S. private sector to support establishment of a reliable domestic production capability for Mo-99 without the use of HEU. • Conduct PRO-X activities addressing HEU and/or plutonium to reduce the risk of potential misuse or production of weapons-usable material. • Implement the ULTB program.	• Decrease reflects the availability of sufficient prior year uncosted balances necessary to execute the planned FY 2024 level of effort. New funding requested plus the use of prior year uncosted balances will support qualifying and fabricating high-density LEU fuels to convert U.S. high performance research reactors; converting and/or verifying the shutdown of research reactor facilities; implementing pilot projects for the PRO-X Program; recovering HALEU scrap from Y-12 in cooperation with BWXT; and providing laboratory expertise to support commercial partners in deploying non-HEU based Mo-99 technologies in the U.S.

Material Management and Minimization
Nuclear Material Removal

Description

The Nuclear Material Removal subprogram, referred to as the Remove subprogram, supports the removal, consolidation, and disposal of nuclear material internationally to support permanent threat reduction. Each kilogram of excess nuclear material that is removed from civilian sites worldwide reduces the risk of a terrorist or other malevolent actor acquiring HEU or plutonium for use in an improvised nuclear device. The subprogram directly advances U.S. and global HEU minimization objectives.

This subprogram consists of two primary lines of effort: 1) Nuclear Material Removal and Consolidation and 2) Mobile Packaging. Under Nuclear Material Removal and Consolidation, the Remove subprogram supports the removal, consolidation, and disposal of weapons-usable nuclear material from civilian facilities around the world. This material includes unirradiated and irradiated HEU of U.S. origin, Russian origin, and other origins, as well as separated plutonium. On a case-by-case basis, in support of nonproliferation objectives, some U.S.-origin LEU that previously fell under the Foreign Research Reactor Spent Nuclear Fuel Acceptance Program (also known as the U.S.-origin program), may be repatriated to the U.S. The subprogram is also developing new capabilities, such as the MMC system, to address inventories of weapons-usable nuclear material that do not currently have a disposition pathway and avoid bringing the material to the U.S. Once operational and deployed internationally in FY 2023, MMC will serve as a mobile platform for stabilizing excess nuclear material and converting it into a more proliferation-resistant, low-attractiveness waste form that can be readily disposed in a storage facility or repository outside the U.S. The subprogram will begin to construct a second MMC system in FY 2023 to support downblending activities in other partner countries. Additionally, the subprogram is launching an initiative called the Nuclear Infrastructure Threat Reduction (NITR) program. The objective is to execute the office's permanent risk reduction mission by eliminating sensitive nuclear infrastructure at research reactor facilities that are being decommissioned so that the equipment cannot be sold, transferred, or diverted for unauthorized use.

The Remove subprogram evaluates excess civilian nuclear material located abroad to prioritize candidate material for removal or disposition. The subprogram evaluates material attractiveness, site- and country-level threats, and other factors to determine which materials are most at-risk and prioritizes them for removal or disposal. Furthermore, the subprogram works with foreign partners to obtain regulatory permits; characterize, stabilize, package, and transport material; and provide replacement LEU or other incentives for other than high income economy countries to encourage elimination of these materials. Additionally, the subprogram coordinates all future U.S. receipts with relevant DOE stakeholders, such as the Office of Environmental Management (EM), to enable long-term planning and appropriate resource allocation.

The Remove subprogram will work closely with international partners to eliminate excess weapons-usable nuclear material to achieve permanent threat reduction and to support either removal or in-country solutions that best meet this objective. Throughout the COVID-19 pandemic, the Remove subprogram has executed nuclear material removals and support planning for future removals, though some projects and exercises were delayed due to restrictions on international travel. In FY 2023, the Remove subprogram supported HEU minimization activities in Central Asia funded through an international contribution received in FY 2022. In FY 2024, the Remove subprogram will work with an international partner to prepare to repatriate a significant quantity of HALEU to support HALEU availability for future conversions and new reactor builds using FY 2023 and FY 2024 appropriated funds.

Under Mobile Packaging, the Remove subprogram maintains the capability to promptly respond to enable the safe and secure removal of nuclear material worldwide. This specialized capability focuses on addressing HEU and plutonium inventories using the MUF and MPF. Both the MUF and MPF include specialized teams and mobile facilities needed to conduct in-country characterization, stabilization, packaging, and removal of nuclear materials. The Mobile Packaging program undertakes full-scale training exercises with the MUF and MPF to maintain team proficiency and ensure both facilities are ready to be deployed on short notice.

Highlights of the FY 2024 Budget Request

- Eliminate excess HEU and plutonium, including removing and/or confirming the disposition of 20 kilograms of nuclear material.
- Conduct a full-scale training exercise of the Mobile Packaging capabilities.

FY 2022 Accomplishments

- Despite significant challenges presented by the COVID-19 pandemic, successfully executed multiple shipments and removed more than 55 kilograms of HEU and plutonium to the U.S. for downblending and disposition, including the completion of two multi-year removal campaigns from Japan.
- Collaborated with international partners to plan for future removal and downblending campaigns of weapons-usable nuclear material from countries in Asia, Europe, and North America.
- Executed Exercise Dark Sleeper, the first full-scale international exercise of the MUF and MPF, to improve team training and mission readiness.

Nuclear Material Removal

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Material Removal $55,000,000	**Nuclear Material Removal $47,100,000**	**Nuclear Material Removal -$7,900,000**
• Remove and/or confirm the disposition of an additional 10 kilograms of HEU and/or plutonium. • Sustain the MUF and MPF equipment and perform off-site readiness exercises that practice the MUF and MPF's capabilities. • Prepare to remove HALEU from a partner country.	• Remove and/or confirm the disposition of an additional 20 kilograms of HEU and/or plutonium. • Sustain the MUF and MPF equipment and perform off-site readiness exercises that practice the MUF and MPF's capabilities. • Engage with partner countries to identify and eliminate sensitive nuclear infrastructure from decommissioning research reactors. • Prepare to remove HALEU from a partner country.	• Decrease reflects the availability of sufficient prior year uncosted balances necessary to maintain the planned FY 2024 level of effort. New funding requested plus the use of prior year uncosted balances will support removing or confirming the disposition of weapons-usable nuclear material; continuing construction of the MMC system 2.0 that started in FY 2023; and executing a large-scale training exercise of the MUF and MPF.

Material Management and Minimization
Material Disposition

Description

The Material Disposition subprogram, referred to as the Dispose subprogram, is responsible for disposing of excess nuclear material in the U.S. and managing the provision of nuclear material for peaceful uses. The subprogram includes activities to disposition 34 metric tons (MT) of surplus plutonium using the dilute and dispose strategy, whereby plutonium is mixed with a multicomponent adulterant and packaged, characterized, and disposed of as transuranic (TRU) waste at the WIPP. The subprogram also includes activities to disposition 186 MT of HEU by downblending it and making the resulting LEU available as fuel for commercial reactors or making supplies of HALEU available for research reactors.

In addition to the efforts to disposition 34 MT of surplus plutonium, the subprogram is also supporting activities to address inventories of plutonium that were consolidated at Savannah River Site (SRS). In FY 2024, the Dispose subprogram will conduct activities to remove and dispose of plutonium from the state of South Carolina including maintaining staffing for downblend and waste characterization operations in K-Area at SRS. Several minor construction projects are underway at SRS to support the plutonium disposition effort. The minor construction project for a storage, characterization, and shipping pad within K-Area was completed, and storage of TRU waste containers began, in FY 2021. Startup testing and certification of the TRU waste characterization equipment was conducted in FY 2021 and FY 2022, and the first shipment of diluted plutonium from K-Area at SRS to WIPP was completed in December 2022. The Dispose subprogram will initiate hiring, training, and qualification for operators of the new gloveboxes being installed in K-Area as part of the Surplus Plutonium Disposition (SPD) project.

An Environmental Impact Statement (EIS) for the 34 MT mission is ongoing and is expected to be complete by the end of CY 2023. The draft EIS has been issued in the Federal Register and the public comment period will complete in March 2023. This EIS is required for the full 34 MT mission, though previous National Environmental Policy Act (NEPA) analysis provides coverage for all activities currently underway, including Advanced Recovery and Integrated Extraction System (ARIES) operations, the SPD line-item project, the downblending of 7.1 MT of the 34 MT of surplus plutonium, and shipments to WIPP of the downblended surplus plutonium.

The Dispose subprogram includes other activities necessary to support the overall program to dispose of 34 MT of surplus weapon-grade plutonium including surveillance, monitoring, and packaging of surplus pits at Pantex and surplus pit disassembly and conversion of resultant metal to oxide, which is being conducted using the ARIES capability at Los Alamos National Laboratory (LANL).

The Dispose subprogram will conduct plutonium oxide production operations at LANL including activities to train and qualify nuclear operators. Additionally, the Dispose subprogram will execute procurement and installation of several Major Items of Equipment (MIEs) at LANL, to improve material movement efficiency, efficiently use shared resources, and address the risk of single points of failure in the ARIES process. Furthermore, the Dispose subprogram will conduct improvements of PF-4 vault storage including the completion of a project to add storage capacity, processing of vault material to free up additional space, and disposition of legacy mixed oxide (MOX) fuel materials currently stored in the vault.

To disposition the 34 MT of surplus plutonium, an expanded Pit Disassembly and Processing (PDP) capability will likely be necessary. An *Approval of Mission Need* Critical Decision (CD-0) was approved for this project in July 2021. DOE/NNSA subsequently initiated an Analysis of Alternatives (AoA) during FY 2021 to evaluate options to expand the PDP capability. The AoA was completed in October 2022 and NNSA is currently assessing the results along with other factors to determine the next steps for oxide production capability.

DOE/NNSA is collaborating with the U.S. national laboratories on a Strategic Laboratory Assessment to continuously develop opportunities for application of state-of-the-art science and technology into the surplus plutonium disposition program to make the system for processing plutonium from storage through WIPP emplacement is as efficient as possible throughout the lifetime of the program. This subprogram will evaluate system-level engineering and technical improvements to improve the efficiency of the dilute and dispose process flowsheet and material handling activities, including the potential use of robotic and virtual reality technology.

The Dispose subprogram also is responsible for preparation of the Japan Fast Critical Assembly (FCA) plutonium fuel for disposition. DOE/NNSA is pursuing the selected approach of electrolytic dissolution using H-Canyon. Physical modifications, including installation of the spare electrolytic dissolver, began in FY 2021. The Japan Atomic Energy Agency (JAEA) is providing the funding for disposition of the FCA fuel.

Furthermore, the Dispose subprogram will focus on international plutonium management strategies by developing and maintaining bilateral and multilateral working arrangements. Participating countries will work together at a technical level to support efforts to manage plutonium inventories in a way that minimizes stockpiles of excess plutonium and maximizes the security and protection of the material.

The subprogram has substantially reduced excess holdings of HEU throughout the DOE/NNSA complex. The subprogram is supporting the Down-Blending Offering for Tritium (DBOT) contract, which runs from FY 2019 through FY 2025. Although DBOT primarily is a NNSA Defense Programs contract, the Dispose subprogram is responsible for managing and funding a portion to support excess HEU disposition. In addition, the Dispose subprogram manages enriched uranium supply and demand needs in support of Office of Defense Nuclear Nonproliferation (DNN) statutory obligations, international commitments or assurances, and to advance nonproliferation mission goals. This includes management oversight of contractors to downblend HEU into HALEU for research reactors and medical isotope production.

The Dispose subprogram will disposition legacy material and low-equity discards stored at Y-12 to reduce risk due to the deteriorating infrastructure and to support the timely transition to the UPF. The HEU Thorium/Building 9206, Area 5 De-inventory (A5D), and Building 9212 discards will be completed in FY 2025, with offsite shipments occurring by 2026.

Highlights of the FY 2024 Budget Request

- Disposition plutonium from the state of South Carolina and carry out the dilute and dispose strategy to fulfill the U.S. commitment to dispose of 34 MT of surplus plutonium.
- Conduct small project installation and operational ramp-up to enable reliable plutonium oxide production.
- Eliminate surplus HEU by downblending it to LEU, or through direct disposal with a priority on legacy material to reduce operating risk in deteriorating infrastructure.

FY 2022 Accomplishments

- Downblended 293.1 kg of NNSA plutonium materials through August 2022, consistent with the August 2020 Amended Record of Decision.
- Maintained four-shift operations of the existing SRS K-Area downblend process.
- Completed construction and started operations of the Characterization and Storage Pad in SRS's K Area and initiated pad storage operations of downblended plutonium in criticality control overpack containers.
- Completed fabrication and procurement of the MD-2 container, a new type B container for transportation of pits.
- Produced 86.2 kg of plutonium oxide using ARIES at LANL in preparation for ultimate disposition.
- Develop draft EIS for the 34 MT mission.
- Installed the electrolytic dissolver, bi-cell tanks, and transformer in H-Canyon to support dissolution of the Japan FCA material.
- Dispositioned HEU through downblending, leveraging the DBOT contract.

Material Disposition

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Material Disposition $256,025,000	**Material Disposition $282,250,000**	**Material Disposition +$26,225,000**
U.S. Plutonium Disposition $204,869,000	**U.S. Plutonium Disposition $235,412,000**	**U.S. Plutonium Disposition +$30,543,000**
• Carry out activities to process and dispose of plutonium from the state of South Carolina. • Resume shipments to WIPP from the storage and characterization pad in K-Area. • Increase pit disassembly and oxide conversion activities to prepare plutonium for disposition. • Provide surveillance and packaging capabilities for surplus pits and plutonium. • Conduct technical baseline management and maturity for the dilute and dispose strategy. • Conduct NEPA analysis for the 34 MT mission. • Support the ongoing maintenance of critical programmatic documents.	• Carry out activities to process and dispose of plutonium from the state of South Carolina. • Increase shipments to WIPP from the storage and characterization pad in K-Area. • Perform pit disassembly and oxide conversion activities to prepare plutonium for disposition. • Conduct disposition of legacy MOX fuel materials stored at LANL. • Provide surveillance and packaging capabilities for surplus pits and plutonium. • Conduct technical baseline management and maturity for the dilute and dispose strategy. • Support the ongoing maintenance of critical programmatic documents.	• Increased activities for higher downblend operational throughput including materials and commodities and increased security. • Increased characterization activities as shipments to WIPP ramp up. • Higher contribution to shared cost model at LANL. • Conduct studies in support of a PDP capability.
U.S. Uranium Disposition $49,909,000	**U.S. Uranium Disposition $45,288,000**	**U.S. Uranium Disposition -$4,621,000**
• Downblend or ship for downblending HEU to produce LEU consistent with specifications. • Downblend HEU into high-assay LEU metal for research reactor fuel and for Mo-99 targets. • Conduct cleanup of legacy material in Y-12's Building 9206, Building 9212, and the A5D to reduce risk. • Support tracking and analyzing enriched uranium supply and demand needs and commitments to meet DNN mission goals.	• Downblend or ship for downblending HEU to produce LEU consistent with specifications. • Downblend HEU into high-assay LEU metal for research reactor fuel and for Mo-99 targets. • Conduct cleanup of legacy material in Y-12's Building 9206, Building 9212, and the A5D to reduce risk. • Support tracking and analyzing enriched uranium supply and demand needs and commitments to meet DNN mission goals.	• Reduction reflects lower support for low-equity discards disposition as that work nears completion.
International Plutonium Disposition $1,247,000	**International Plutonium Disposition $1,550,000**	**International Plutonium Disposition +$303,000**
• Implement plutonium management strategies with international partners.	• Implement plutonium management strategies with international partners.	• No significant change.

Material Management and Minimization
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	13,489	14,474	15,472	+998
Final Processing System - Conversion Furnace (previously Conversion to Oxide Furnace) (BWXT)	3,600	0	0	3,600	0	-3,600
Acid Cleaning Line, BWXT	4,000	0	0	4,000	0	-4,000
E-beam Weld System (BWXT, INL)	4,504	3,284	1,220	0	0	0
Integrated Data Management System, SRS	18,000	0	0	0	18,000	+18,000
Material Intro Hood #2, LANL	11,639	0	0	0	0	0
Upgrade Bagout Port for Uranium Processing, LANL	6,034	0	0	0	0	0
Calorimeter #2 for Large Containers (formerly Install Second Calorimeter), LANL	7,803	0	7,803	0	0	0
Transfer Glovebox for Inline Storage, LANL (previously New Transfer/Storage	15,811	0	0	0	0	0
Install In-Line NDA Capability, LANL	22,388	0	0	22,388	0	-22,388
SAVY Packaging and Bagout GB, LANL	25,688	0	0	0	0	0
Inline Storage Glovebox #2, LANL	33,475	0	0	0	0	0
Inline NDA in existing GB, LANL	18,125	0	0	0	0	0
Upgrade Uranium Decontamination System in Existing GBs, LANL	16,082	0	0	0	16,082	16,082
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**22,512**	**44,462**	**49,554**	**+5,092**

Outyears for Capital Equipment Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	16,190	16,530	16,877	17,232	N/A
Material Intro Hood #2, LANL	11,639	0	0	0	0
Upgrade Bagout Port for Uranium Processing, LANL (moved to MIE)	6,034	0	0	0	0
Transfer Glovebox for Inline Storage, LANL (previously New Transfer/Storage GB, LANL)	0	15,811	0	0	0
SAVY Packaging and Bagout GB, LANL	0	0	0	25,688	0
Inline Storage Glovebox #2, LANL	0	0	0	0	33,475
Inline NDA in existing GB, LANL	0	0	18,125	0	0
Total, Capital Equipment (including MIE)	**33,863**	**32,341**	**35,002**	**42,920**	**N/A**

Global Material Security

Overview

The Global Material Security (GMS) program directly contributes to national security efforts to reduce global nuclear and radiological security threats. GMS focuses on preventing terrorists and other actors from obtaining nuclear and radioactive material to use in an improvised nuclear device (IND) or a radiological dispersal device (RDD) and works with international partners to implement nuclear security approaches to reduce the risk of radioactive releases resulting from malicious acts at or near nuclear facilities. GMS works with partner countries to improve the security of vulnerable materials and facilities and to improve partners' capacity to detect, disrupt, and investigate illicit trafficking of these materials. GMS promotes long-term sustainability of its capacity-building support by working with partners to develop their own regulations and inspections processes, training infrastructure, maintenance approaches, exercise and performance testing programs, life-cycle planning, and nuclear security culture. To enhance its reach and effectiveness, GMS provides technical and policy support to multilateral organizations, including the International Atomic Energy Agency (IAEA), the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, the World Customs Organization (WCO), the UN Office on Drugs and Crime (UNODC), and the International Criminal Police Organization (INTERPOL). As part of an ongoing strategic analysis process, GMS explores innovative approaches, technologies, and tools to adapt to emerging threats and the growing demand for nuclear energy and technology. GMS supports U.S. national security priorities to reduce global nuclear security threats and sustain access to needed peaceful applications of nuclear technology that support climate change, energy security, and global health priorities.

GMS consists of three subprograms: International Nuclear Security (INS), Radiological Security (RS), and Nuclear Smuggling Detection and Deterrence (NSDD).

This Budget Request includes funding in each GMS subprogram to support material security and counter smuggling initiatives in Ukraine to respond to increased threats and risks caused by the unjustified and unprovoked Russian invasion. Funding would also be employed to assist Ukrainian partners to rebuild and strengthen critical nuclear and radiological security infrastructure when conditions allow. GMS subprograms will define this scope further in the coming months through continued engagement with Ukrainian counterparts.

Global Material Security
Funding (Comparable)

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Global Material Security					
International Nuclear Security	79,939	87,763	84,707	-3,056	-3.5%
Radiological Security	253,002	260,000	258,033	-1,967	-0.8%
Nuclear Smuggling Detection and Deterrence	198,500	185,000	181,308	-3,692	-2.0%
Total, Global Material Security	**531,441**	**532,763**	**524,048**	**-8,715**	**-1.6%**

Global Material Security
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Global Material Security				
International Nuclear Security	90,768	89,433	86,093	86,710
Radiological Security	281,080	263,118	265,009	267,902
Nuclear Smuggling Detection and Deterremce	188,016	189,481	192,704	193,067
Total, Global Material Security	**559,864**	**542,032**	**543,806**	**547,679**

Global Material Security
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Global Material Security	
International Nuclear Security: No major changes	**-3,056**
Radiological Security: No major changes	**-1,967**
Nuclear Smuggling Detection and Deterrence: No major changes	**-3,692**
Total, Global Material Security	**-8,715**

Global Material Security
International Nuclear Security

Description
The International Nuclear Security (INS) subprogram leads U.S. international nuclear security efforts by working with partner countries, international organizations, and non-governmental organizations to prevent theft and sabotage of nuclear material and protection of nuclear facilities worldwide.

For more than 20 years, Department of Energy (DOE)/National Nuclear Security Administration (NNSA) has leveraged the expertise of the U.S. national laboratories to mitigate the risks of terrorists acquiring nuclear material. While these efforts have dramatically improved nuclear security around the world, gaps remain. Global expansion of the civilian nuclear fuel cycle, evolving adversary capabilities and tactics, and the availability of technologies to execute attacks present a significant concern for global nuclear security.

INS is evolving with these risks. While highly enriched uranium and weapons-grade plutonium remain a top priority, INS also is concerned with other high-risk materials and the impacts of attacks on nuclear facilities. INS also examines emerging issues and technologies that could present risks or opportunities for nuclear security in the future and develops innovative approaches to integrate these findings into partner country engagements.

Accordingly, INS works across the globe to secure weapons-usable nuclear materials, nuclear power plants and nuclear fuel cycle facilities, research and non-power reactors, and materials in transit. INS is developing a strategy to promote nuclear security best practices with countries interested in pursuing civil nuclear energy programs. INS also partners with U.S. industry on Security by Design activities to enhance security of advanced reactor designs. These measures are part of a broader DOE/NNSA effort to support future nuclear energy technology development and deployment that meets climate change goals and applies graded security measures and nonproliferation considerations.

Across all these areas, INS employs a risk-informed approach to prioritize engagements with partner countries to identify and reduce threats and risks by enhancing or building effective, comprehensive nuclear security regimes with its partners. Effective and comprehensive nuclear security regimes must include laws, regulations, procedures, people, organizations, training, and technologies—all of which must be integrated with operations, safety, the public, and the international community.

Based on an assessment of threats and vulnerabilities, INS implements nuclear security upgrades in select partner countries. INS also assists partner countries with developing and implementing effective nuclear security regulations, training and educational programs, secure transportation, protective force capabilities, material control and accounting capabilities, cybersecurity programs for nuclear facilities, and insider threat mitigation programs, which include strong nuclear security culture and performance evaluations.

INS leverages a variety of partnerships in pursuit of its mission, including partnerships with the IAEA, the World Institute for Nuclear Security (WINS), the Global Partnership against the Spread of Weapons and Materials of Mass Destruction, INTERPOL, non-governmental organizations, and U.S. industry. Partnering with the IAEA is of particular importance to strengthen global nuclear security norms and standards and to reinforce bilateral nuclear security risk-reduction work. INS works with the IAEA on the development of nuclear security guidance documents, advanced training, advisory missions, technical meetings, and major conferences. INS also partners with the IAEA to develop nuclear security support centers (NSSCs) that help maintain expertise and serve as resources for nuclear security capacity-building.

Highlights of the FY 2024 Budget Request
- Sustain and build upon previous upgrades at nuclear facilities and deepen existing bilateral relationships with more than 60 countries through technical exchanges and training on a wide range of nuclear security topics.
- Develop innovative risk mitigation approaches for a range of fuel cycle facilities, including select nuclear power plants, and address current nuclear security challenges such as drones, cybersecurity, and artificial intelligence.

- Partner with the IAEA to enhance training capabilities, develop guidance, and conduct outreach to nuclear newcomers and with INTERPOL to train law enforcement agencies that engage with or support nuclear facilities worldwide.
- Increase efforts to raise nuclear security awareness for countries embarking on new or expanding existing civil nuclear power programs.
- Partner with U.S. industry on Security-by-Design for advanced reactors to support climate change and innovation goals in a secure manner.
- Expand efforts to promote the role of women in nuclear security and develop next generation nuclear security experts.

FY 2022 Accomplishments

- Provided equipment to the National Guard of Ukraine to strengthen their capability to protect nuclear power plants still in Ukrainian control.
- Expanded bilateral cooperation on a wide range of nuclear security topics to nearly 60 countries.
- Initiated upgrades at nuclear facilities in Hungary, Poland, Democratic Republic of Congo, and Jordan.
- Collaborated with three U.S. advanced and small modular reactor vendors on Security-by-Design efforts and partnered with 12 countries embarking on new nuclear power programs.
- Developed a sabotage mitigation initiative for key partners where nuclear power plants are critical to energy security.
- Conducted Over the Horizon assessments of emerging threats and technologies and completed investigations into impacts of technologies, such as Industrial Internet of Things (iIOT) on nuclear security.
- Partnered with the IAEA to develop an e-Learning module on nuclear security infrastructure for newcomer countries.
- Worked with the IAEA to strengthen and support the Nuclear Security Support Centers (NSSCs).
- Supported IAEA advisory missions, international/regional/national training courses and provide subject matter expertise to build sustainable, effective global nuclear security guidance.
- Advanced IAEA Information Circulars 908 and 909 on Insider Threat and Transportation Security and maintained international focus on insider threat mitigation.
- Launched the Black Sea Women in Nuclear regional network through the INS Nuclear Security Women (NSW) initiative.

International Nuclear Security

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
International Nuclear Security $87,763,000	**International Nuclear Security $84,707,000**	**International Nuclear Security -$3,056,000**
• Expand collaboration with nearly 60 countries on a wide range of nuclear security issues. • Sustain and build upon previous upgrades at nuclear facilities. • Sustain and build upon previous upgrades to reduce the risk of sabotage at facilities in key locations. • Implement a sabotage mitigation initiative with key partners where nuclear power plants are critical to energy security. • Adapt to a virtual training and engagement environment due to COVID-19, including launching a Learning Management System for foreign partners. • Expand engagements with nuclear newcomer countries on nuclear security infrastructure development and capacity-building to meet sustainable development goals. • Engage in technical partnerships with industry on Security by Design for advanced reactors for future global deployments, in support of sustainable energy goals. • Further innovation in nuclear security to address emerging risks and develop sustainable security options for our partners. • Expand INS' Nuclear Security Women (NSW) initiative to promote the role and visibility of women in nuclear security by providing education, training, research, and other	• Expand collaboration with more than 60 countries on a wide range of nuclear security issues. • Sustain and build upon previous upgrades at nuclear facilities and reduce the risk of sabotage at facilities in key locations. • Implement a sabotage mitigation and energy security initiative with additional key partners where nuclear power plants are critical to energy security. • Expand engagements with nuclear newcomer countries on nuclear security infrastructure development and capacity-building to meet sustainable development goals. • Engage in technical partnerships with industry on Security by Design for advanced reactors for future global deployments in support of sustainable energy goals. • Develop additional tools, technologies, modeling, simulation, and analytical methods to support security analyses of advanced reactor classes. • Further innovation in nuclear security to address evolving risks and develop sustainable security options for our partners. • Expand NSW initiative to promote the role and visibility of women in nuclear security. • Support for IAEA international training courses and workshops, expert positions, guidance development, and engagement with nuclear newcomers.	• No major changes.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
professional development opportunities to create the next generation of nuclear security experts. • Support for IAEA international training courses and workshops, expert positions, guidance development, and engagement with nuclear newcomers. • Support INTERPOL's law enforcement training efforts to improve engagement/support of nuclear facilities worldwide. • Support WINS in areas such as emerging threats and technology engagements, cybersecurity, and performance evaluation. • Develop strategies, tools, and processes for cybersecurity, insider threat mitigation, and other dynamic nuclear security functional areas, as well as new areas of engagement including countering unmanned aerial systems, artificial intelligence, and other emerging technical areas.	• Support INTERPOL's law enforcement training efforts to improve engagement in support of nuclear facilities worldwide. • Support WINS in areas such as emerging threats and technology engagements, transportation, performance evaluation, the development of a young professional program in nuclear security. • Develop strategies, tools, and processes for cybersecurity, insider threat mitigation, and other dynamic nuclear security functional areas, as well as other areas of engagement including countering unmanned aerial systems, artificial intelligence, advanced cybersecurity technologies such as Software Defined Networking, and other emerging technical areas.	

Global Material Security
Radiological Security

Description

The Radiological Security (RS) subprogram supports U.S. national security and plays an important role in preventing radiological terrorism at home and abroad by working with partners to secure high-risk radioactive materials that could be used in acts of terrorism. Radioactive materials are used worldwide to diagnose and treat diseases such as cancer, sterilize medical instruments, and monitor the structural integrity of materials. However, these same radioactive materials pose a risk to the safety and security of our Nation if not properly protected, removed, or replaced with alternative technologies.

RS reduces the risk of radioactive materials falling into the wrong hands and being used in a radiological dispersal device (RDD). An RDD could have devastating economic and psychological consequences for our country and create panic. To mitigate that risk, RS applies a "cradle-to-grave" approach to radioactive source security by addressing vulnerabilities during all phases of the lifecycle of radioactive sources, including production, transportation, use, and end-of-life. RS leverages the unique technical capabilities of the U.S. national laboratories to develop and implement sustainable security solutions that take into consideration the needs of radioactive source users. RS has developed an integrated and comprehensive approach to security by working closely with government partners, the response community, and the private sector.

To mitigate the risk of radiological terrorism, RS employs a three-pronged strategy, which includes reducing the reliance on radioactive sources to achieve permanent risk reduction, removing disused or orphaned sources, and protecting high-activity sources.

RS prioritizes efforts to reduce reliance on radioactive sources by encouraging the transition away from radioactive sources to more secure alternatives to permanently reduce risk by eliminating high-activity sources and obviating the need to introduce new sources. Technologies for alternatives are maturing and new technologies are entering the market. Domestically, RS disseminates information on these alternative technologies and provides cost-sharing incentives to volunteer organizations willing to transition away from Cesium-137 irradiators to non-radioisotopic technologies through its Cesium Irradiator Replacement Project (CIRP). RS is on track to eliminate Cesium-137 blood irradiators in the U.S. by December 31, 2027, as outlined in the FY 2019 National Defense Authorization Act (NDAA). RS also is increasing its focus on alternatives for Cobalt-60 devices, which are often used for cancer treatment.

Next, where appropriate, RS addresses the vulnerability of disused or orphan radioactive sources by removing, consolidating into secure storage and, if possible, disposing of those sources that pose a potential risk to national security, public health, and safety through the Off-Site Source Recovery Program (OSRP). On a case-by-case basis, RS also repatriates high-risk U.S.-origin sources from international locations.

Finally, RS protects high-activity radioactive materials located at vulnerable locations (e.g., hospitals, universities) in the U.S. and worldwide. Domestically, RS works in close cooperation with radioactive material users, industry partners, state regulators, and the Nuclear Regulatory Commission. Additionally, an effective and safe response to a radiological theft is a critical component of radiological security. RS works domestically with local law enforcement to provide resources, training, and tools that enable a more effective response to the potential theft of high-activity radioactive material. Internationally, RS works in close cooperation with radioactive material users and national, regional, and multilateral partners, including the IAEA and INTERPOL. RS implements state-of-the-art security solutions to protect radioactive material at volunteer sites, including implementing mobile source transit security systems for sources used in the well logging and radiography industries.

Highlights of the FY 2024 Budget Request

- Maintain focus on the transition from high-activity radioactive sources to non-radioisotopic alternative technologies through (1) efforts to replace 85 Cesium-137 devices (70 domestically under CIRP and 15 internationally), and (2) a new initiative to incentivize the use of alternatives to Cobalt-60.
- Remove an additional 810 unwanted sealed sources (510 domestically and 300 internationally) for disposition or long-term storage.

- Enhance capabilities to manage disused sources safely and securely and build international partner capacity to manage disused sources themselves.
- Protect an additional 30 buildings (20 domestically and 10 internationally) with high-priority radioactive sources.
- Maintain and expand partnerships with U.S. industry to identify new security solutions to address risks and increase security of radioactive materials.
- Fabricate a mobile hot cell for high-activity disused source removals.

FY 2022 Accomplishments

- Provided equipment and training to partners in Ukraine to monitor and secure radioactive sources.
- Replaced 91 devices (80 domestically and 11 internationally) that use high-activity radioactive sources with non-radioisotopic alternative technologies and expanded education and outreach to encourage broader adoption of technologies that do not use high-activity radioactive sources.
- Recovered and disposed of over 530 excess and unwanted sealed sources from locations throughout the U.S. and 30 disused or unwanted radioactive sources in other countries.
- Secured a total of 19 buildings (17 domestic and 2 international) with high-priority radioactive sources.
- Maintained momentum for the RadSecure 100 Initiative and worked to secure volunteer buildings with high-risk quantities of radioactive sources in major metropolitan areas of the U.S.
- Increased coordination between sites that have high-priority radioactive material and local law enforcement agencies responsible for protecting those sites, such as developing and deploying a new mobile, cloud-based application called, Sentry-SECURE, for greater situational awareness.
- Collaborated with U.S. industry on Security-by-Design to make source-based devices and facilities inherently more secure in the manufacturing process.
- Expanded In-Device Delay installations at Gamma Knife facilities internationally.
- Worked with partners to sustain previously installed security upgrades.

Radiological Security

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Radiological Security $260,000,000	**Radiological Security $258,033,000**	**Radiological Security -$1,967,000**
• Replace 85 devices (70 domestically and 15 internationally) that use high-activity radioactive sources with non-radioisotopic alternative technologies. • Remove an additional 700 (500 domestically and 200 internationally) excess and unwanted sealed sources for disposition or long-term storage. • Protect an additional 35 buildings (20 domestically and 15 internationally) with high-priority radioactive sources. • Through the RadSecure 100 Initiative, expand response training and coordination efforts with local law enforcement in additional metropolitan areas across the U.S. • Support the secure and peaceful use of advanced nuclear technologies by facilitating access to non-radioisotopic alternative technologies which can be achieved through device installation, infrastructure improvements, outreach, and education. • Work with industry, regulators, and operators to enhance security of high-activity radioactive sources during transportation. • Maintain focus on cybersecurity, insider threat mitigation, and security culture in the U.S. and abroad, providing partners with training and other technical assistance to keep radioactive materials secure. • Work to complete the priority site physical protection upgrades and engagements with	• Replace 85 devices (70 domestically and 15 internationally) that use high-activity radioactive sources with non-radioisotopic alternatives. • Remove an additional 810 (510 domestically and 300 internationally) excess and unwanted sealed sources for disposition or long-term storage. • Protect an additional 30 buildings (20 domestically and 10 internationally) with high-priority radioactive sources. • Through the RadSecure 100 Initiative, expand response training and coordination efforts with local law enforcement in additional metropolitan areas across the U.S. • Support the secure and peaceful use of advanced nuclear technologies by facilitating access to non-radioisotopic alternatives through device installation, infrastructure improvements, outreach, and education. • Work with industry, regulators, and operators to enhance security of high-activity radioactive sources during transportation. • Maintain focus on cybersecurity, insider threat mitigation, and security culture in the U.S. and abroad, providing partners with training and other technical assistance to keep radioactive materials secure.	• No major changes.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
industry partners that were impacted by the COVID pandemic.		

Global Material Security
Nuclear Smuggling Detection and Deterrence

Description

The Nuclear Smuggling Detection and Deterrence (NSDD) subprogram works to build global capacity to detect, disrupt, and investigate the smuggling of nuclear and radioactive material before it can be used in an act of terrorism. NSDD provides partners with tailored radiation detection systems based on assessments of high-risk smuggling pathways and operational environments. NSDD partners include law enforcement, intelligence, and border security organizations. To facilitate long-term system operability, NSDD works with partners to develop their capabilities across five performance areas: policies and procedures, operations, training, maintenance, and assessment. NSDD coordinates closely with other U.S. Government agencies (e.g., Departments of Homeland Security, State, Defense, and Justice) to maximize the impact of U.S. Government resources, and collaborates with international organizations such as INTERPOL, IAEA, the Border Monitoring Working Group, and WCO to promote consistency and act as a force multiplier in global efforts to counter nuclear smuggling.

NSDD addresses gaps in global counter nuclear smuggling capabilities by expanding program initiatives and partnerships to address the evolving geopolitical landscape and emergence of new global threats. NSDD cooperates with partners to establish and sustain a defense-in-depth detection strategy at:

- High-priority points of entry, including land border crossings, rail crossings, airports, and seaports,
- Along frontier areas, working with border and maritime security agencies at green and blue borders, and
- Within the interior of states, partnering with law enforcement and security services.

NSDD works with partners to build necessary capabilities in a manner commensurate with partners' existing security practices. NSDD will work to expand and deepen existing relationships with partner country agencies that enhance policies and procedures, operations, training, maintenance, and assessment of deployed systems. These collaborations are also designed to enhance the partner's investigation support capabilities to include capacity-building focused on isotopic identification and analysis of detected material. Together, these tools contribute to building a practical, comprehensive, and effective counter nuclear smuggling system.

Highlights of the FY 2024 Budget Request

- Equip priority points of entry with radiation detection systems and provide associated training and maintenance support to help counter the threat of illicit trafficking of nuclear and radioactive material; Central Asia, Eastern Europe, Africa, and South and Southeast Asia are priority regions.
- Strengthen radiation detection and interdiction capabilities in high-risk maritime and land frontier areas.
- Strengthen interdiction and inspection capabilities of Internal Security and Law Enforcement units making intelligence-driven decisions to patrol and protect internal checkpoints, major public events, and possible adversary targets of interest such as critical infrastructure.
- Build, sustain, and evaluate partner agencies' capabilities in five performance areas critical to achieving baseline counter nuclear smuggling operability: policies and procedures, operations, training, maintenance, and assessment.
- Enhance layered defenses in Ukraine and Eastern Europe to respond to the increased risk of nuclear smuggling following Russia's further invasion of Ukraine and seizure of radioactive storage sites and nuclear facilities.

FY 2022 Accomplishments

- Deployed additional equipment and associated training to border security, law enforcement, and emergency agencies across Ukraine to detect and deter illicit movement of materials and, in coordination with the Counterterrorism and Counterproliferation program, monitor for radiation release within Ukraine.
- Strengthened radiation detection, surveillance, and interdiction capabilities of green border security teams near sensitive and high-risk areas on green borders by continuing three Green Border Security Initiative projects.
- Provided 16 counter nuclear smuggling systems to enhance the capabilities of law enforcement and intelligence agencies, provided 27 systems at official points of entry to close key gaps in the global nuclear detection architecture in ten countries, and connected radiation detection sites to national communications systems in three countries.

- Provided radiation detection tools for interdiction of small maritime vessels in the Indian Ocean and the Arabian Sea.
- Established three new bilateral partner country engagements to strengthen nuclear investigation support capabilities, bringing the total number of current investigation support engagements to 39 partners.
- Conducted outreach engagements in over 30 countries in Africa, the Middle East, and South and Southeast Asia, and completed three new agreements with high-priority partners.
- Met the FY 2022 target of 76% of partner agencies demonstrating operational capability of counter nuclear smuggling systems.
- Completed service life extensions at 100 sites across a total of 17 partner countries.
- Conducted over 33 events, workshops, and exercises and 50 training courses to advance partner country capabilities in radiation detection operations and sustainability, equipment maintenance, and investigation support.

Nuclear Smuggling Detection and Deterrence

Activities and Explanation of Changes

<table>
<tr><th>FY 2023 Enacted</th><th>FY 2024 Request</th><th>Explanation of Changes
FY 2024 Request vs
FY 2023 Enacted ($)</th></tr>
<tr><td>Nuclear Smuggling Detection and Deterrence
$185,000,000</td><td>Nuclear Smuggling Detection and Deterrence
$181,308,000</td><td>Nuclear Smuggling Detection and Deterrence
-$3,692,000</td></tr>
<tr><td>
Meet the FY 2023 target for 77% of partner agencies to demonstrate operational capability of counter nuclear smuggling systems.
Deploy counter nuclear smuggling systems at 23 interdiction points.
Complete a total of 10 projects along points of entry, enhancing radiation detection capabilities at: six large-scale border crossing points, one seaport, and three airports.
Enhance frontier area interdiction and inspection capabilities by completing five projects providing radiation localization and identification equipment, along with ancillary interdiction equipment, to enforcement units by completing four Green Border Security Initiative projects and one Maritime Vector Partnership project.
Strengthen interdiction, inspection, and investigation capabilities of internal security and law enforcement units by completing eight projects providing radiation detection equipment, ancillary equipment, and human resource development.
Support capacity-building activities in five performance areas (policies and procedures, operations, training, maintenance, and assessment) in partner countries to promote system operability.
Conduct assessments of partners’ baseline counter nuclear smuggling operability.
</td><td>
Meet the FY 2024 target for 78% of partner agencies to demonstrate operational capability of counter nuclear smuggling systems.
Deploy counter nuclear smuggling systems to 46 interdiction points:

Complete 12 projects at points of entry,
Complete 9 frontier area interdiction and inspection projects, and
Complete 25 projects with internal security and law enforcement partners.

Conduct over 60 drills, workshops, or exercises and complete over 70 training courses to advance partner country capabilities in operating, maintaining, sustaining, and managing radiation detection measures, to include investigations.
Conduct outreach to initiate partnerships with law enforcement, intelligence, and border security agencies in Africa and South/SE Asia.
Establish regional technical and maintenance providers in new areas to further sustainability efforts and pursue new investigation support partnerships, including with nuclear newcomer states.
</td><td>
No major changes
</td></tr>
</table>

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Conduct over 60 drills, workshops, or exercises and complete over 50 training courses to advance partner country capabilities in operating, maintaining, sustaining, and managing radiation detection measures, to include investigations. • Initiate new, high-priority engagements with law enforcement, intelligence, and border security agencies in the Sahel and Southeast Asia. • Establish regional technical and maintenance providers in new areas to further sustainability efforts and pursue new investigation support partnerships, including with nuclear newcomer states.		

Global Material Security
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	6,823	7,321	7,826	+505
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**6,823**	**7,321**	**7,826**	+505

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	8,189	8,361	8,537	8,716	N/A
Total, Capital Equipment (including MIE)	**8,189**	**8,361**	**8,537**	**8,716**	**N/A**

Nonproliferation and Arms Control

Overview

The Nonproliferation and Arms Control (NPAC) program enhances U.S. national security and facilitates legitimate civil nuclear cooperation by reducing global nuclear proliferation threats. The NPAC program applies its unique technical and policy expertise residing in DOE/NNSA to support U.S. nonproliferation and arms control objectives to prevent proliferation, support peaceful nuclear uses, and enable verifiable nuclear reductions. The NPAC program pursues these objectives through four subprograms: (1) International Nuclear Safeguards; (2) Nuclear Export Controls; (3) Nuclear Verification; and (4) Nonproliferation Policy. Respectively, these offices: strengthen international nuclear safeguards; control the proliferation of nuclear material, equipment, technology, and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and develop programs and strategies to anticipate and address nuclear nonproliferation and arms control challenges and opportunities. Across these programmatic functions, NPAC plays a leading role in addressing current threats while also drawing upon its expertise to anticipate emerging nonproliferation challenges and develop technical approaches and potential policy solutions.

Nonproliferation and Arms Control
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Nonproliferation and Arms Control					
International Nuclear Safeguards	*98,181*	*90,279*	*76,196*	*-14,083*	*-15.6%*
Nuclear Export Controls	*36,623*	*44,083*	*44,214*	*+131*	*+0.3%*
Nuclear Verification	*36,991*	*68,840*	*73,605*	*+4,765*	*+6.9%*
Nonproliferation Policy	*13,000*	*27,454*	*18,343*	*-9,111*	*-33.2%*
Total, Nonproliferation and Arms Control	**184,795**	**230,656**	**212,358**	**-18,298**	**-7.9%**

Nonproliferation and Arms Control
Outyear Funding

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Nonproliferation and Arms Control				
International Nuclear Safeguards	*79,713*	*80,005*	*80,805*	*81,006*
Nuclear Export Controls	*46,249*	*46,339*	*45,513*	*45,126*
Nuclear Verification	*69,764*	*70,024*	*71,292*	*71,464*
Nonproliferation Policy	*31,254*	*34,200*	*34,825*	*34,310*
Total, Nonproliferation and Arms Control	**226,980**	**230,568**	**232,435**	**231,906**

Nonproliferation and Arms Control
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Nonproliferation and Arms Control	
International Nuclear Safeguards: The decrease in funding reflects project lifecycle progress for a unique technology test bed for the International Atomic Energy Agency (IAEA), as well as work that was accelerated for the Advanced Reactor International Safeguards Engagement (ARISE) program in FY 2023.	**-14,083**
Nuclear Export Controls: No major changes.	**+131**
Nuclear Verification: The increase in funding is for additional activities in the Arms Control Advancement Initiative (ACAI), including detailed planning related to the high-fidelity verification user facility, human capital development program, and for increased engagement with international partners on monitoring and verification activities.	**+4,765**
Nonproliferation Policy: The decrease reflects the use of carryover balances for e810 system improvements, studies on nonproliferation impacts of non-land based nuclear reactors, and other technical and policy studies.	**-9,111**
Total, Nonproliferation and Arms Control	**-18,298**

Nonproliferation and Arms Control
International Nuclear Safeguards

Description

The International Nuclear Safeguards (NS) subprogram strengthens the international nuclear safeguards regime and the IAEA's ability to verify peaceful uses of nuclear materials and facilities and detect non-compliance. NS manages programs to strengthen the technology and human capital base to support safeguards, oversees activities of the U.S. Support Program to IAEA Safeguards, collaborates with the IAEA and other partners to enhance the implementation of safeguards norms and best practices, promotes Safeguards by Design elements with the U.S. nuclear industry, oversees implementation of U.S. Additional Protocol (AP) and Voluntary Offer Agreement (VOA) safeguards requirements and activities at Department of Energy (DOE) sites and facilities, and assesses the physical protection of U.S.-obligated nuclear materials overseas. NS also provides support to the IAEA to implement its monitoring and verification mandate in Iran.

Highlights of the FY 2024 Budget Request

- Implement ongoing DOE/NNSA statutory and treaty/agreement obligations and authorities, including physical security assessment visits for U.S.-obligated materials at foreign facilities; implementing U.S. safeguards obligations under the U.S. VOA/AP; and international safeguards training.
- Support effective IAEA safeguards and verification of Iran's nuclear program.
- Prepare and execute test-plan activities at the nonproliferation enrichment testing and training platform to develop and test technologies and approaches for transfer to the IAEA in collaboration with select international partners.
- Strengthen the U.S. safeguards technology and human capital base to meet projected resource requirements.
- Implement ARISE program, including working with key stakeholders to incorporate Safeguards by Design elements into advanced reactor designs.
- Initiate AUKUS safeguards workplans with Australia, United Kingdom, U.S., and the IAEA.
- Promote universal adherence to the highest standard of IAEA Safeguards Agreements: A Comprehensive Safeguards Agreement with an AP, and a modified Small Quantities Protocol (where applicable).
- Provide customized training and outreach to more than 50 international partners to enable effective and efficient IAEA safeguards implementation around the world.
- Implement changes to the safeguards approach for plutonium subject to the VOA for surplus plutonium disposition from K-Area Material Storage to Waste Isolation Pilot Plant to enable ongoing transparency.
- Facilitate legitimate nuclear cooperation and minimize the proliferation risks of the expansion of civil nuclear power through capacity-building in nuclear safeguards.
- Enhance nonproliferation opportunities with international partners through targeted peaceful uses engagement projects.

FY 2022 Accomplishments

- Maintained implementation of safeguards obligations at DOE facilities through remote means, after the onset of the COVID-19 pandemic.
- Implemented more than 50 domestic and international safeguards engagement workshops via remote/virtual and in-person delivery.
- Promoted peaceful uses of nuclear technology globally, including through projects with U.S. nuclear medical societies to provide targeted peaceful uses assistance with Tanzania and Ghana, and provided funding to the IAEA to facilitate over a dozen projects with partner countries.
- Transferred six safeguards technology tools to international partners, including U-233 isotope dilution mass spectrometry standards for environmental sample analysis and a prototype unattended UF6 cylinder verification station for IAEA verification at enrichment and fuel-fabrication facilities.

International Nuclear Safeguards

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
International Nuclear Safeguards $90,279,000	**International Nuclear Safeguards $76,196,000**	**International Nuclear Safeguards -$14,083,000**
• Develop safeguards technologies and approaches to: (1) promote integration of features into advanced reactor designs to facilitate the application of IAEA safeguards; (2) improve efficiencies of safeguards; and (3) enhance inspector capabilities in high-priority areas such as enhanced in-field collection analysis and detection of undeclared activities. • Transfer safeguards tools to international partners or organizations to meet identified safeguards deficiencies. • Prepare the nonproliferation enrichment testing and training platform for commissioning in FY 2024 to develop and test technologies for transfer to the IAEA. • Improve safeguards concepts and approaches for new facilities and fuel cycles and analyze the implications of emerging technology to international safeguards applications. • Develop and promote integration of Safeguards by Design elements into U.S. advanced reactor and fuel cycle facility designs to facilitate opportunities for international deployment. • Expand and enhance efforts to promote universal adherence to IAEA safeguards agreements and good practices in safeguards implementation by providing customized training and outreach to more than 70 countries. • Expand non-power peaceful uses activities to other areas of the developing world to	• Develop safeguards technologies and approaches to: (1) promote integration of features into advanced reactor designs to facilitate the application of IAEA safeguards; (2) improve efficiencies of safeguards; and (3) enhance inspector capabilities in high-priority areas such as in-field collection analysis and detection of undeclared activities. • Transfer safeguards tools to international partners or organizations to meet identified safeguards deficiencies. • Prepare and execute test-plan activities at the nonproliferation enrichment testing and training platform to develop and test technologies and approaches for transfer to the IAEA in collaboration with select international partners. • Improve safeguards concepts and approaches for new facilities and fuel cycles and analyze the implications of emerging technologies. • Develop and promote integration of Safeguards by Design elements into U.S. advanced reactor and fuel cycle facility designs. • Expand and enhance efforts to promote universal adherence to IAEA safeguards agreements and good practices in safeguards implementation by providing training and outreach to more than 70 countries. • Expand non-power peaceful uses activities to other areas of the developing world to strengthen the NPT and further enhance	• The decrease in funding reflects project lifecycle progress for a unique technology test bed for the IAEA, as well as work accelerated for the ARISE program in FY 2023.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
strengthen the Nuclear Nonproliferation Treaty (NPT) and further enhance safeguards implementation and regulatory effectiveness. • Maintain support for accredited IAEA Network of Analytical Laboratories at the U.S. national laboratories. • Maintain qualified and knowledgeable safeguards staff at the U.S. national laboratories and IAEA through early and mid-career safeguards positions at the U.S. national laboratories and safeguards training courses. • Cooperate with the Department of State, the Department of Defense, the Nuclear Regulatory Commission, and the IAEA to develop guidelines and policies to help prioritize the allocation of safeguards resources in ways that will strengthen the IAEA's ability to detect, deter, and investigate undeclared nuclear activities. • Provide on an as-requested basis technical and technology assistance to the IAEA to monitor Iran's nuclear program, and to prepare for possible involvement in denuclearization activities in Democratic People's Republic of Korea (DPRK). • Implement U.S.-IAEA safeguards obligations at DOE facilities, including annual reporting requirements as required by U.S. law and treaty obligations. • Lead U.S. Government assessments of the physical protection of U.S.-obligated nuclear materials at foreign facilities.	safeguards implementation and regulatory effectiveness. • Maintain support for accredited IAEA Network of Analytical Laboratories at the U.S. national laboratories. • Maintain qualified and knowledgeable safeguards staff at the U.S. national laboratories and the IAEA through early and mid-career safeguards positions at the U.S. national laboratories and safeguards training courses. • Develop guidelines and policies to help prioritize the allocation of safeguards resources in ways that will strengthen the IAEA's ability to detect, deter, and investigate undeclared nuclear activities. • Provide on an as-requested basis technical and technology assistance to the IAEA to monitor Iran's nuclear program, and to prepare for possible involvement in denuclearization activities in DPRK. • Implement U.S.-IAEA safeguards obligations at DOE facilities, including annual reporting requirements as required by U.S. law and treaty obligations. • Lead U.S. Government assessments of the physical protection of U.S.-obligated nuclear materials at foreign facilities. • Implement remote or virtual engagements when necessary and where practical and enhance eLearning opportunities to expand outreach capabilities.	

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Implement remote or virtual engagements when necessary and where practical and enhance eLearning opportunities to expand outreach capabilities.		

Nonproliferation and Arms Control
Nuclear Export Controls

Description

The Nuclear Export Controls subprogram facilitates peaceful nuclear cooperation by strengthening domestic and global capacity to detect and prevent the illicit transfer of nuclear and dual-use materials, equipment, and technology. The subprogram has effectively migrated its technical and policy expertise to support the evolution of traditional export controls to the broader industrial policies of the U.S. Government (e.g., the CHIPS Act). The subprogram implements and oversees programs that: provide technical and end-user evaluations of U.S. export license applications; provide technical support that enhances the U.S. Government's capacity to detect and interdict illicit nuclear and dual-use commodity technology transfers to foreign programs of concern; provide technical support to the multilateral nonproliferation export control regimes; and strengthen foreign partner national systems of export control consistent with U.S. policy and the multilateral supplier regimes.

Highlights of the FY 2024 Budget Request

- Implement ongoing DOE/NNSA statutory obligations and authorities, including U.S. nonproliferation and export control activities (export license reviews and interdiction case technical reviews).
- Contribute to the development of U.S. export control and other policies that protect the U.S. industrial base and counter rivals' effort to acquire U.S. goods and know-how for military or economic advantage.
- Facilitate legitimate nuclear cooperation and minimize the proliferation risks of the expansion of civil nuclear power through international capacity-building and engagement in export controls.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges to anticipate and prevent nuclear technological surprises.
- Develop and deploy new training materials for international and domestic audiences to raise awareness of the potential proliferation risks of new emerging technologies.
- Support interagency efforts to assess emerging and foundational technologies to prevent proliferation and establish effective unilateral and multi-lateral export controls.
- Counter illicit acquisition of weapons of mass destruction (WMD)-related dual-use goods by engaging 35+ countries to strengthen implementation of national strategic trade controls systems.
- Work closely with U.S. export enforcement agencies to provide training relevant to current threats to the U.S. industrial base.
- Expand technical support to the multilateral regimes (i.e., Wassenaar) and other arrangements (i.e., IAEA technical cooperation projects).
- Execute the Export Compliance Assistance Program (ECAP) to raise awareness of export compliance responsibilities, assist in developing strategies for complying with all U.S. export control laws and regulations, and provide export compliance training to Federal employees, their staff, and contractors at DOE and DOE/NNSA Headquarters, Field and Site Offices, and sites and facilities.

FY 2022 Accomplishments

- Delivered six emerging technologies virtual seminars focusing on implementation of Section 1758 of the Export Control Reform Act.
- Conducted 62 export control training and other types of events for U.S. enforcement agencies and international partners, while developing new training materials for use in FY 2022 and beyond.
- Delivered new and innovative training and exercises alongside the U.S. interagency (Departments of Justice, Commerce, State, and Homeland Security) for Philippines prosecutors, police, and customs officers to identify the legal tools that can be applied to investigate and prosecute export control violations in the Philippines' export control system.
- Supported U.S. Government counter-Russia objectives by contributing to the development of export control and sanctions rules following Russia's invasion of Ukraine.
- Collaborated with U.S. and European partners on training and analysis related to enforcing Russian and other sanctions.
- Completed approximately 7,000 technical reviews of U.S. export licenses for nuclear and dual-use commodities and more than 2,000 technical analyses for interdiction cases and unique analytical products regarding proliferation trends.

Nuclear Export Controls

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Export Controls $44,083,000	**Nuclear Export Controls $44,214,000**	**Nuclear Export Controls +$131,000**
• Engage foreign partners on a bilateral and regional basis to strengthen their national export control systems to help prevent illicit trafficking in nuclear and WMD-related materials, commodities, and technology. This is accomplished through training and technical cooperation to exchange export control best practices and build the capacity of key countries to serve as trainers for their region. • Train U.S. export enforcement officials to familiarize them with controlled nuclear and dual-use material, equipment, and technology, which could be used for WMD purposes, and collaborate with the Customs and Border Protection (CBP's) National Targeting Center (NTC). Provide technical reach back to U.S. export enforcement agencies. • Perform technical reviews of U.S. export licenses for nuclear and dual-use commodities, perform reviews of nuclear software code requests and U.S. Munitions List cases, provide state-of-the-art technology assessments to the multilateral export control regimes, review IAEA technical cooperation (TC) projects for proliferation concerns, and provide training courses for DOE and other U.S. Government officials regarding evolving export-controlled technologies and proliferation concerns. • Support the U.S. Government enforcement community by providing technical analyses for	• Engage foreign partners on a bilateral and regional basis to strengthen their national export control systems to help prevent illicit trafficking in nuclear and WMD-related materials, commodities, and technology. This is accomplished through training and technical cooperation to exchange export control best practices and build the capacity of key countries to serve as trainers for their region. • Train U.S. export enforcement officials to familiarize them with controlled nuclear and dual-use material, equipment, and technology, which could be used for WMD purposes, and collaborate with the CBP's NTC. Provide technical reach back to U.S. export enforcement agencies. • Perform technical reviews of U.S. export licenses for nuclear and dual-use commodities and U.S. Munitions List cases, provide state-of-the-art technology assessments to the multilateral export control regimes, review IAEA technical cooperation (TC) projects for proliferation concerns, and provide training courses for DOE and other U.S. Government officials regarding evolving export-controlled technologies and proliferation concerns. Perform end-user reviews of parties of concern to inform licensing efforts. • Support the U.S. Government interdiction community by providing technical analyses for	• No major changes.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
interdiction cases and unique analytical products regarding proliferation trends. • Maintain and support information technology systems to support export control licensing, interdiction analysis, and the multilateral nonproliferation export control regimes. • Provide technical reviews of proposed transfers of items, materials, goods, and technology to Iran in accordance with applicable United Nations (UN) Security Council resolutions. • Support ECAP which deploys export control awareness training and provides export compliance guidance and assistance across DOE and DOE/NNSA facilities targeted at the Federal workforce, their staff, and contractors. • Work to address potential proliferation risks associated with emerging and foundational technologies in cooperation with the U.S. interagency and international partners, as appropriate. • Support the U.S. Government's interest in strengthening the Biological and Toxin Weapons Convention (BWC) by conducting a study to look at ways to strengthen this international convention, including the feasibility of a potential BWC verification regime.	interdiction cases and unique analytical products regarding proliferation trends. • Maintain and support information technology systems to support export control licensing, interdiction analysis, and the multilateral nonproliferation export control regimes. • Provide technical reviews of proposed transfers of materials, equipment, and technology to support U.S. Government sanctions efforts and in accordance with applicable UN Security Council resolutions. • Support ECAP which deploys export control awareness training and provides export compliance guidance and assistance across DOE and DOE/NNSA facilities targeted at the Federal workforce, their staff, and contractors. • Work to address potential proliferation risks associated with emerging and foundational technologies in cooperation with the U.S. interagency and international partners, as appropriate. • Support the U.S. Government's interest in strengthening the BWC by providing technical expertise to assess ways to strengthen this international convention, including the feasibility of a potential BWC verification regime.	

Nonproliferation and Arms Control
Nuclear Verification

Description

The Nuclear Verification subprogram reduces proliferation concerns and enhances U.S. strategic stability by enabling verifiable nuclear and chemical arms reductions, and supports the negotiation and implementation of U.S. nonproliferation and arms control treaties and agreements. The subprogram conducts applied technology development, testing, evaluation, maintenance, and deployment of monitoring technologies and develops monitoring and verification approaches informed through analysis of the potential impacts of initiatives on U.S. national laboratories, plants, and sites. The subprogram also executes NNSA's human capital program focused on the next generation of arms control policy and technical experts. Additionally, the subprogram maintains technical readiness to negotiate and implement future nuclear fuel cycle transparency agreements and conducts U.S.-led missions to monitor, verify, disable, and dismantle proliferant nuclear weapons programs around the world. The subprogram performs monitoring and verification activities under existing agreements and supports U.S. Government review of other countries' compliance with their treaty and agreement obligations. The subprogram also contributes to U.S. policy development for treaty and agreement implementation while upholding U.S. requirements for maintaining a safe, secure, and reliable nuclear weapons stockpile.

Highlights of the FY 2024 Budget Request

- Implement a monitoring and verification initiative (ACAI) to develop the needed DOE/NNSA facilities, projects, and personnel to bolster the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches.
- Develop an arms control user facility to support DOE/NNSA's arms control monitoring and verification stretch approach, which draws upon additional measures and data to greatly complicate any efforts to circumvent monitoring regimes.
- Implement ongoing DOE/NNSA treaty/agreement obligations and authorities, including implementing DOE obligations under the Plutonium Production Reactor Agreement (PPRA), Chemical Weapons Convention (CWC), and the NPT.
- Support compliance analysis and implementation of the New Strategic Arms Reduction Treaty (New START) and other arms control agreements.
- Maintain technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through strategic tool maintenance and regular verification team exercise and training events.
- Develop a U.S. field verification capability to confirm aspects of a nuclear weapons development program.
- Develop and maintain monitoring and verification teams to build readiness for future U.S.-led on-site monitoring and verification activities.

FY 2022 Accomplishments

- Implemented DOE/NNSA treaty/agreement obligations and authorities, including DOE obligations under the PPRA, the CWC, and the NPT.
- Supported negotiations, compliance analysis, and implementation of New START and other arms control agreements, including the CWC.
- Supported multiple Administration-directed national security policy reviews: arms control policy, the Comprehensive Nuclear-Test-Ban Treaty (CTBT), and Nuclear Posture Review.
- Supported work to address the long-term technical challenges of nuclear disarmament verification.
- Maintained technical and manpower readiness for future U.S.-led monitoring and verification of denuclearization activities through strategic tool maintenance and regular verification team exercise and training events.
- Conducted development of a U.S. field verification capability to confirm whether a suspect event is an underground nuclear explosion, and if so, determine and assess key event parameters.

Nuclear Verification

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Verification $68,840,000	**Nuclear Verification $73,605,000**	**Nuclear Verification +$4,765,000**
• Support U.S. implementation, compliance analyses, and policy development for the New START Treaty, the CWC, and other arms control agreements, while protecting DOE/NNSA equities and interests. • Implement U.S. and DOE/NNSA legal obligations under the CWC, including maintaining accreditation of the Organisation for the Prohibition of Chemical Weapons (OPCW) laboratory at Lawrence Livermore National Laboratory (LLNL). • Under the terms of the PPRA, if feasible, conduct up to three monitoring visits in Russia to ensure that Russian plutonium oxide is stored securely and that shutdown Russian plutonium production reactors remain in a non-operational status, and, if required, host Russian monitors on annual PPRA monitoring visit to shutdown U.S. plutonium production reactors at the Savannah River Site. • Conduct national security and nuclear nonproliferation activities related to nuclear testing limitations, including those that support monitoring and verification capabilities under the CTBT International Monitoring System and International Data Centre that complement and strengthen U.S. nuclear explosion monitoring and verification capabilities. • Provide seismic monitoring capacity-building under the Seismic Cooperation Program to	• Support U.S. implementation, compliance analyses, and policy development for the New START Treaty, the CWC, and other arms control agreements, while protecting DOE/NNSA equities and interests. • Implement U.S. and DOE/NNSA legal obligations under the CWC, including maintaining accreditation of the OPCW laboratory at LLNL. • Conduct detailed planning for the high-fidelity verification user facility project as part of the ACAI. • Under the terms of the PPRA, if feasible, conduct up to three monitoring visits in Russia to ensure that Russian plutonium oxide is stored securely and that shutdown Russian plutonium production reactors remain in a non-operational status, and, if required, host Russian monitors on annual PPRA monitoring visit to shutdown U.S. plutonium production reactors at the Savannah River Site. • Conduct national security and nuclear nonproliferation activities related to nuclear testing limitations, including those that support monitoring and verification capabilities under the CTBT International Monitoring System and International Data Centre that complement and strengthen U.S. nuclear explosion monitoring and verification capabilities. • Provide seismic monitoring capacity-building under the Seismic Cooperation Program to	• The increase in funding is for additional activities in the ACAI, including detailed planning related to the high-fidelity verification user facility, human capital development program, and for increased engagement with international partners on monitoring and verification activities.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
foreign partner institutions to enhance their abilities to detect and analyze possible nuclear explosions, as well as mitigate geophysical hazards. • Develop, test, and evaluate verification procedures and technologies; train and exercise specialized U.S. verification teams; and conduct operations planning to maintain short-notice readiness for U.S.-led monitoring and verification of nuclear weapons material production programs and associated denuclearization efforts around the world. • Develop, test, and evaluate warhead and weapons material monitoring and verification procedures and technologies, and support international technical engagements to address long-term verification challenges. • Collaborate with the United Kingdom under the 1958 Mutual Defense Agreement (MDA) and with other partner countries to develop potential common approaches to nuclear verification issues. • Expand training and eLearning where possible to maintain on-site verification readiness capabilities. • Initiate and implement a monitoring and verification initiative that bolsters the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches.	foreign partner institutions to enhance their abilities to detect and analyze possible nuclear explosions, as well as mitigate geophysical hazards. • Develop, test, and evaluate verification procedures and technologies; train and exercise specialized U.S. verification teams; and conduct operations planning to maintain short-notice readiness for U.S.-led monitoring and verification of nuclear weapons material production programs and associated denuclearization efforts around the world. • Develop, test, and evaluate warhead and weapons material monitoring and verification procedures and technologies, and support international technical engagements to address long-term verification challenges. • Collaborate with the United Kingdom under the 1958 MDA and with other partner countries to develop potential common approaches to nuclear verification issues. • Expand training and eLearning where possible to maintain on-site verification readiness capabilities and monitoring and verification expertise, including the Next Generation Arms Control Experts program. • Implement a monitoring and verification initiative that bolsters the expertise and technology critical to sustaining DOE/NNSA's arms control mission and accelerate the development of new technologies and approaches.	

Nonproliferation and Arms Control
Nonproliferation Policy

Description

The Nonproliferation Policy subprogram performs a longstanding role in developing and implementing programmatic efforts that anticipate and address enduring and emerging nuclear nonproliferation challenges and opportunities. The subprogram serves as the DOE/NNSA lead in supporting the negotiation and implementation of nonproliferation agreements and requirements set forth in the Atomic Energy Act of 1954 (AEA), as amended; the 1978 Nuclear Nonproliferation Act; National Defense Authorization Acts (NDAAs); and other national nonproliferation initiatives, agreements, and treaties, including the NPT. In addition, the subprogram leads efforts to develop DOE/NNSA nonproliferation policy guidance on nuclear technology transfer and nuclear fuel cycle issues, undertakes activities to improve and update multilateral nuclear supplier arrangements, and identifies supplier vulnerabilities and potential gaps in supplier arrangements, including the Nuclear Suppliers Group (NSG). The subprogram also implements the regulations at 10 CFR Part 810 (Part 810), which control the export of unclassified nuclear technology and assistance, pursuant to Section 57b(2) of the AEA, as amended. Additionally, the subprogram supports activities focused on reducing the danger of nuclear war and preventing the proliferation of nuclear weapons in critical regions and preparing DOE/NNSA for cross-cutting and emerging changes to the threat environment.

Highlights of the FY 2024 Budget Request

- Implementation of a new and improved 123 Agreement negotiation strategy will result in an increase in the number of 123 negotiations and administrative arrangements in FY 2024.
- Provide technical leadership as part of the U.S. delegation to the NSG through the provision of expertise to enable NSG controls to keep pace with technological, industry, and proliferation developments.
- Develop technical and policy solutions that support the implementation of high-level Administration initiatives to address pressing proliferation concerns, including the effective implementation of the NPT and related elements of the nonproliferation regime.
- Facilitate legitimate civil-nuclear commerce and minimize the proliferation risks of the expansion of civil nuclear power through international outreach.
- Provide nonproliferation assessments of emerging nuclear technologies and other emerging strategic risks and challenges.
- Implement legal authority to impose monetary civil penalties for violations of the Part 810 regulation.
- Develop, expand, and improve e810 to respond to industry and internal feedback.
- Account for high-assay low-enriched uranium and fuel supply issues and options in conjunction with current proliferation and global political considerations.
- Analyze multilateral and supply arrangements following the Russian invasion of Ukraine and subsequent activity minimizing Russian material supply.

FY 2022 Accomplishments

- Processed 55 Part 810 specific authorization applications and requests for amendments, including end-use and technical reviews, and reviewed 624 reports and notifications for compliance with Part 810.
- Publish a Federal Register Notice and Communications Plan for the regulatory rule change to impose monetary civil penalties for violations of Part 810 as directed by the FY 2019 NDAA.
- Began redevelopment of e810 system to better interface with industry.
- Provided key technical support as required by the AEA (or "as legally required") for the U.S.-UK 123 Agreement to ensure that significant U.S. and UK civil nuclear cooperation, previously conducted under the auspices of the U.S.-Euratom 123 Agreement, continues uninterrupted.
- Conducted multi-laboratory analyses of advanced reactor and related fuel cycle technologies to identify gaps created by these emerging technologies. Used results to inform the ongoing development of a U.S. interagency strategy on how to approach advanced technology proposals in the NSG.
- Maintained U.S. support and leadership in the NSG by providing Technical Export Group (TEG) and Information Exchange meeting Chairs as well as the Assistants to the Consultative Group Chair and TEG.

- Enhanced and provided ongoing support for the NSG Information Sharing System (NISS) system, including revision of the NISS Forum that will facilitate NSG intercessional collaboration on the technical work of the NSG.
- Provided foundational understanding of cross-cutting and emerging changes to the nonproliferation threat environment.
- Conducted Track 1.5 engagements in South Asia, East Asia, and the Middle East to reduce the danger of nuclear war and discourage the spread of nuclear weapons in critical regions.
- Expanded the reach of South Asia-focused social media and web-based projects to promote U.S. interests in the region to 4 million viewers.
- Launched a Track 1.5 initiative to focus on strengthening support for the NPT by developing a community of transatlantic deterrence experts and cultivating the next generation of deterrence experts.
- Completed development on version 1.1 of the NISS Web Application.

Nonproliferation Policy

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nonproliferation Policy $27,454,000	**Nonproliferation Policy $18,343,000**	**Nonproliferation Policy -$9,111,000**
• Support the ongoing statutory responsibility for regulating the export of civil nuclear technology and assistance under 10 CFR Part 810 by processing specific authorization applications and requests for amendments and renewals, including end-use and technical reviews. • Expand enforcement and compliance efforts and implementation of new (FY 2022) civil penalty authority rulemaking. • Support implementation of U.S. deliverables for the 2026 NPT Review Cycle and associated nonproliferation, disarmament, and peaceful uses objectives. • Conduct track 1.5 deterrence dialogue engagements to provide innovative solutions to NPT challenges. • Provide technical support to strengthen the international export control regimes including the NSG. • Play a critical role on the development of policy initiatives and programming to ensure that the NSG Guidelines and control lists remain effective and credible (e.g., advanced reactors and reprocessing technical studies). • Develop and execute a U.S. strategy for addressing advanced reactor technologies in the NSG. • Conduct targeted NSG industry outreach activities on technological and commercial developments of the NSG Guidelines.	• Support the ongoing statutory responsibility for regulating the export of civil nuclear technology and assistance under 10 CFR Part 810 by processing specific authorization applications and requests for amendments and renewals, including end-use and technical reviews. • Expand Part 810 enforcement and compliance efforts and implementation of new (FY 2023) civil penalty authority rulemaking. • Support implementation of U.S. deliverables for the 2026 NPT Review Cycle and associated nonproliferation, disarmament, and peaceful uses objectives. • Conduct track 1.5 deterrence dialogue engagements to provide innovative solutions to NPT challenges. • Play a critical role on the development of policy initiatives and programming to ensure that the NSG Guidelines and control lists remain effective and credible (e.g., advanced reactors and reprocessing technical studies). • Develop and execute a U.S. strategy for addressing advanced reactor technologies in the NSG. • Conduct ongoing U.S. support and maintenance of the NISS Web and Web Ex Applications. • Provide statutorily mandated technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding administrative arrangements.	• The decrease reflects the use of carryover balances for e810 system improvements, studies on nonproliferation impacts of non-land based nuclear reactors, and other technical and policy studies

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Provide leadership and logistical/meeting planning support for U.S. Chair of the NSG. • Conduct ongoing U.S. support and maintenance of the NISS Web and Mobile Applications. • Provide statutorily mandated technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding administrative arrangements. • Provide statutorily mandated technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding administrative arrangements. • Develop mechanisms to increase the number of 123 Agreements that balance U.S. nonproliferation norms and support U.S. industry while meeting future partners' desire to access U.S. technology. • Provide technical assistance to the negotiation of potential Section 123 Agreements for Cooperation and their corresponding Administrative Arrangements. • Lead preparations for the High-Level Bilateral Commission under the U.S.-Republic of Korea 123 Agreement. • Conduct analyses of accountancy information in support of the implementation of bilateral 123 Agreements. • Conduct studies and analyses on current and future nonproliferation challenges in coordination with the U.S. national laboratories and prominent industry experts. • Advance program goals utilizing a limited travel environment post-COVID, including through delivery of online trainings and engagements,	• Develop mechanisms to increase the number of 123 Agreements that balance U.S. nonproliferation norms and support U.S. industry while meeting future partners' desire to access U.S. technology. • Lead preparations for the High-Level Bilateral Commission under the U.S.-Republic of Korea 123 Agreement. • Conduct analyses of accountancy information in support of the implementation of bilateral 123 Agreements. • Conduct analyses on current and future nonproliferation challenges in coordination with the U.S. national laboratories and non-government experts. • Conduct Track 1.5 and Track 2 dialogues in South Asia, East Asia, and the Middle East to reduce the danger of nuclear war and discourage the spread of nuclear weapons in critical regions.	

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
and continued development of existing virtual platforms. • Conduct track 1.5 engagements in regions of concern to reduce the danger of nuclear war and dissuade the proliferation of nuclear weapons. • Grow South Asia-focused social media and web-based projects to promote U.S. interests in the region.		

Overview

The National Nuclear Security Administration (NNSA) Bioassurance Program improves U.S. biodefenses by advancing laboratory capabilities to anticipate, detect, and mitigate biological threats. Department of Energy (DOE)/NNSA leverages capabilities and expertise developed at the U.S. national laboratories in areas such as high-performance computing, modeling and simulation, laboratory analyses, and data analytics to enhance biodefense through multi-disciplinary systems analysis and engineering expertise in surveillance, detection, safeguards, and export controls, and through forensics to support attribution.

It is a vital interest of the U.S. to prepare for, prevent, detect, respond to, and recover from biological threats, whether naturally occurring, accidental, or deliberate. Moreover, few other national security threats are capable of producing catastrophic and potentially existential global consequences at the scale and speed of biological threats. Therefore, developing predictive biodefense capabilities is a top national and international security priority for the U.S. This is addressed in the National Biodefense Strategy (NBS) and its Implementation Plan, the President's Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy, and in National Security Memorandum 15 (NSM-15) on countering biological threats. And while nearly all executive departments and agencies contribute to the biodefense mission of the U.S. Government, these strategic documents recognize DOE/NNSA's unique position to advance underlying capabilities that can accelerate mission success for many of these activities across the interagency.

NNSA's Bioassurance Program is implemented in close coordination with the DOE Office of Science (SC). DOE/NNSA will leverage DOE national laboratory capabilities, including expertise in national security and biological sciences and engineering, to translate SC-supported fundamental science to improve resilience and address national security risk. NNSA will coordinate with DOE-SC and the interagency biodefense enterprise to provide a full representation of DOE capabilities and perspectives in the interagency planning processes and ensure transparency. NNSA will also partner with the intelligence community to understand and address threats to bio-energy systems, biomaterials, and manufacturing, particularly as linked to the national security sector, including predictive threat assessment and response in national security science and technology channels. In performing its distinctive role, DOE/NNSA will nurture and sustain long-term foundational capabilities in bioassurance so that DOE/NNSA's interagency partners can leverage the core competencies and capability to meet their own higher-level, agency-specific requirements. Rapid response to a national security biothreat requires access to leadership-class computing and experimental facilities, sometimes at connected (multiple institutions) and classified venues which uniquely exist in NNSA.

Informed by a recent assessment of bioassurance-related capability gaps, NNSA's Bioassurance Program will support the following NBS Objectives: 1.1 (ensure decision-making is informed by intelligence forecasting and risk assessment); 1.2 (ensure that domestic and global biothreat detection, biosurveillance, and information systems are coordinated, integrated, and capable of enabling timely prevention, detection, reporting, assessment, response and recovery); 2.4 (strengthen biosafety and biosecurity practices and oversight to mitigate risk); 3.5 (enhance preparedness through development, testing, evaluation, manufacturing, regulatory approval, distribution and administration of countermeasures); and 4.3 (conduct bioforensics and attribution using all available tools).

The FY 2024 Budget Request provides support for enabling infrastructure, applied science and technology, and an expert workforce in three broad technical tracks, identified by the laboratories as historical strengths and aligned with the NBS: 1) Threat Anticipation and Assessment (supporting Objective 1.1); 2) Signature Discovery and Early Detection (supporting Objectives 1.2 and 4.3); and 3) Threat Mitigation and Safeguards (supporting Objectives 2.4 and 3.5).

NNSA will approach these areas with a global perspective, and a heritage (within its nuclear nonproliferation experience) of mating advancing science and technology with an understanding of existential threats and related threat anticipation, assessment, and response. These investments will enable the program to fulfill NNSA's authorization to reduce global danger from weapons of mass destruction and support U.S. leadership in science and technology.

NNSA Bioassurance Program
Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
NNSA Bioassurance Program	**0**	**20,000**	**25,000**	**+5,000**	**25.0%**

NNSA Bioassurance Program
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
NNSA Bioassurance Program	**30,000**	**35,000**	**40,000**	**50,144**

NNSA Bioassurance Program
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
NNSA Bioassurance Program: Develops initial operating capability and coordinated DOE program in biosciences, including infrastructure improvements, and minor equipment purchases based on a prioritized technical roadmap.	+5,000
Total, NNSA Bioassurance Program	**+5,000**

Defense Nuclear Nonproliferation
NNSA Bioassurance Program

Description

Funding for the NNSA Bioassurance Program develops an initial operating capability and coordinated DOE program in biosciences, including initial implementation of a prioritized technical roadmap, with infrastructure improvements and minor equipment purchases. In FY 2024, these priorities will continue to be coordinated in consultation with interagency partners, including as described in interdepartmental Memoranda of Understanding.

Highlights of the FY 2024 Budget Request

- Develop the NNSA Bioassurance Program initial operating capability.
- Complete integration of a biothreats/biotechnology risk assessment that identifies bioassurance needs and gaps, and integrate science and technology (S&T) plan within a long-term program framework that sustains a bioassurance capability in the DOE national laboratories.
- Initiate prioritized research in accordance with S&T plan to develop computational predictive models of potential threats and impacts, including threat model validation, detection and characterization acceleration, and to develop safeguards and forensics research & development (R&D) and threat mitigation approaches.

FY 2022 Accomplishments

- Not applicable.

NNSA Bioassurance Program

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
NNSA Bioassurance Program $20,000,000	**NNSA Bioassurance Program $25,000,000**	**NNSA Bioassurance Program +$5,000,000**
• Establish NNSA Bioassurance Program. • Perform a biothreats/biotechnology risk assessment that includes bioassurance needs/gaps and infrastructure needs to sustain a long-term research and development program and bioassurance capability in the DOE national laboratories. • Align the program framework with the developing national security requirements for implementing the National Biodefense Strategy. • Complete the Bioassurance Program Goals, Objectives, and Requirements (GOR) document to guide technical road-mapping process. • Provide procurement funding for minor equipment and infrastructure upgrades within the NNSA laboratories to support the GOR of Bioassurance.	• Develop the NNSA Bioassurance Program initial operating capability, in full coordination with DOE-SC and the interagency. • Complete the technical roadmap identifying long-term bioassurance requirements and infrastructure needs integrate with S&T plan. • Initiate prioritized research, in accordance with technical roadmap and GOR document, to develop computational predictive models of potential threats and impacts, including threat model validation, detection and characterization acceleration, and to develop safeguards and forensics R&D and threat mitigation approaches.	• Develops initial operating capability and coordinated DOE program in biosciences, including infrastructure improvements and minor equipment purchases based on a prioritized technical roadmap.

NNSA Bioassurance Program
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	0	8,000	8,000	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**0**	**8,000**	**8,000**	**0**

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	8,000	5,000	4,000	4,000	N/A
Total, Capital Equipment (including MIE)	**8,000**	**5,000**	**4,000**	**4,000**	**N/A**

Defense Nuclear Nonproliferation Research and Development

Overview

The Defense Nuclear Nonproliferation Research and Development (DNN R&D) program directly contributes to nuclear security by developing U.S. capabilities to detect and characterize global nuclear security threats in full coordination with the goals and priorities of U.S. Government mission stakeholders across nonproliferation, counterterrorism, and emergency response mission areas. In addition, DNN R&D sustains and develops foundational nonproliferation technical competencies that ensure the technical agility needed to support a broad spectrum of U.S. nonproliferation missions and anticipate threats. To do these activities, DNN R&D leverages the unique facilities and scientific skills of the Department of Energy (DOE), academia, and industry to perform research and demonstrate advances in capabilities, develop prototypes, and produce sensors for integration into operational systems.

Specifically, the DNN R&D program makes these strategic contributions through the innovation of U.S. technical capabilities to detect, identify, locate, and characterize foreign nuclear material production and weapons development activities; movement and illicit diversion of special nuclear materials; and global nuclear detonations. DNN R&D also supports arms control negotiations and verification, as well as other strategic stability efforts; emergency response; and nuclear forensics R&D to support time-critical decisions in the event of a nuclear or radiological incident or assist in determining the origin of interdicted materials or nuclear devices. These technical capabilities are either advanced to higher maturities, transitioned to stakeholders for further development for mission-specific applications, or transferred to operational performers. In addition, DNN R&D sustains and develops foundational nonproliferation technical competencies by providing targeted, long-term support for enabling infrastructure, science and technology, and an expert workforce.

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Defense Nuclear Nonproliferation R&D					
Proliferation Detection	**269,407**	**299,283**	**290,388**	**-8,895**	**-3.0%**
Nuclear Detonation Detection	**294,500**	**279,205**	**285,603**	**+6,398**	**+2.3%**
Nonproliferation Fuels Development	**20,000**	**20,000**	**0**	**-20,000**	**-100.0%**
Forensics R&D	**45,000**	**44,414**	**44,759**	**+345**	**+0.8%**
Nonproliferation Stewardship Program	**100,329**	**125,000**	**107,437**	**-17,563**	**-14.1%**
Total, Defense Nuclear Nonproliferation R&D	**729,236**	**767,902**	**728,187**	**-39,715**	**-5.2%**

Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR):

- FY 2022 Enacted: SBIR: $14,785; STTR: $0
- FY 2023 Enacted: SBIR: $14,735; STTR: $0
- FY 2024 Request: SBIR: $13,972; STTR: $0

Defense Nuclear Nonproliferation Research and Development (DNN R&D)
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Defense Nuclear Nonproliferation R&D				
Proliferation Detection	**305,158**	**307,319**	**307,079**	**309,075**
Nuclear Detonation Detection	**304,058**	**321,312**	**311,192**	**308,288**
Nonproliferation Fuels Development	**0**	**0**	**0**	**0**
Forensics R&D	**47,106**	**47,463**	**45,439**	**45,770**
Nonproliferation Stewardship Program	**102,128**	**101,856**	**104,799**	**105,474**
Total, Defense Nuclear Nonproliferation R&D	**758,450**	**777,950**	**768,509**	**768,607**

Defense Nuclear Nonproliferation Research and Development
Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Defense Nuclear Nonproliferation Research and Development	
Proliferation Detection (PD): Decrease reflects completion of equipment purchases and change in SRNL O&M funding mechanism.	**-8,895**
Nuclear Detonation Detection (NDD): Increase reflects space-based sensor production needs in preparation for deliveries to the U.S. Space Force (USSF) and planned programmatic phasing of experimental and research activities in low-yield nuclear monitoring field experiments.	**+6,398**
Nonproliferation Fuels Development: No funding is requested to continue this activity in FY 2024.	**-20,000**
Forensics R&D: No significant change.	**+345**
Nonproliferation Stewardship Program (NSP): Decrease reflects the early completion of Phase 1 of the Uranium Science and Technology Center testbed.	**-17,745**
Total, Defense Nuclear Nonproliferation Research and Development	**-39,715**

Defense Nuclear Nonproliferation Research and Development
Proliferation Detection

Description

The Proliferation Detection (PD) subprogram develops technologies to detect foreign nuclear weapons programs; support nuclear arms control treaty verification by improving compliance monitoring capabilities; and support national nuclear security and interdiction of nuclear materials outside of regulatory control. PD efforts are aligned along these major functional areas: (1) Nuclear Weapons Development and Material Production Detection efforts targeted toward the detection, identification, location, and characterization of foreign nuclear weapons program activities; (2) Nuclear Weapons and Material Security efforts targeted toward nuclear security and nuclear arms control treaty monitoring and verification tools and applications, operational interdiction, radiological source replacement, and nuclear security efforts across DOE's National Nuclear Security Administration (NNSA); and (3) Nonproliferation Enabling Capabilities efforts supporting a broad R&D base to bring new, cross-cutting technologies to multi-use applications across NNSA and the interagency community, including a field experiment and demonstration program and university research program. The field demonstration program integrates research and experimental testbed activities to advance technology in support of the Nation's treaty verification and monitoring needs.

As part of DNN R&D's University Consortia for Nuclear Nonproliferation, PD supports three consortia which link universities and DOE national laboratories to address basic research shortfalls in nuclear nonproliferation and security and treaty compliance monitoring. All currently funded consortia have a Minority Serving Institution (MSI) component and will place a particular emphasis on encouraging the participation of Historically Black Colleges and Universities (HBCU) and other MSIs through planned funding opportunity announcements (FOA).

Highlights of the FY 2024 Budget Request

- Advance U.S. detection and characterization capabilities of foreign nuclear weapons production activities through 2028.
- Achieve improvements in U.S. capabilities in nuclear weapons and material security applications, including detecting special nuclear material (SNM) and its movement, incident response, and nuclear safeguards.
- Conduct programmatic activities for nonproliferation and foreign weapons program activity monitoring through execution and development of national testbeds for validation of new sensors, equipment, and capabilities.
- Provide a broad, underlying set of technical capabilities that support nuclear nonproliferation and nuclear security, continuing to expand current technical frameworks.
- Execute an integrated approach to broadened strategic arms control & verification R&D to identify key technologies considering emerging threats.
- Align with the developing interagency requirements for early detection of nuclear proliferation, including SNM production and cross-cutting artificial intelligence and other data science applications.

FY 2022 Accomplishments

- Implemented two field campaigns in conjunction with interagency partners at testbeds designed to test technologies developed to improve U.S. capabilities to detect and monitor foreign nuclear material production.
- Discovered new, mission-relevant signatures and transitioned software to operational stakeholders through SISKO, a data science project with direct relevance to PPD-33.
- Initiated a multi-lab, multi-year project to develop and test advanced technologies to collect and evaluate signatures and observables associated with a commercial facility performing uranium conversion.
- Executed two explosive campaigns in support of weapons development detection.
- Deployed two of 16 planned multi-sensor, networked development nodes in Chicago on the Domain Awareness Waggle Network to achieve improved, real-world, real-time radiological anomaly detection and isotope identification by integrating sensors and algorithms for edge and cloud analytics.
- Conducted a successful demonstration of the Semi-Automated Scene Generation for Diagnostics capability to render safe and other emergency response end users across the U.S. interagency.

- In support of warhead monitoring, completed neutron radiography measurements at Y-12 and demonstrated the ability to generate 3-D images showing fission locations in highly enriched uranium storage castings and canned subassemblies.
- Transitioned two small-business innovation research (SBIR) projects on X-ray source replacement to DNN's Office of Global Material Security for Phase III development.

Proliferation Detection

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Proliferation Detection $299,283,000	**Proliferation Detection $290,388,000**	**Proliferation Detection -$8,895,000**

• Develop and demonstrate advances in U.S. capabilities to detect and characterize foreign nuclear programs, especially in denied areas as follows: advance sensor and algorithm development and demonstrate technologies and methods in operational testbed environments for SNM production detection; Understand the impact of alternative manufacturing techniques and advance stand-off detection methods for weaponization activities to monitor the potential technical breakout of foreign weapons programs; Develop new analytic approaches to move proliferation detection to earlier timelines and close information gaps in denied areas.
• Develop and demonstrate advances in U.S. capabilities to strengthen nuclear security across the threat spectrum as follows: advance detection and imaging for SNM detection, develop and advance safeguards technology, and address nuclear data gaps in support of nuclear security.
• Expand efforts focusing on arms control and warhead verification and monitoring R&D, and initiate activities to advance expected arms reduction technical frameworks and enable improved vulnerability assessments to expand U.S. technical options and flexibility in future negotiations.
• Support three university consortia to address basic gaps in nuclear nonproliferation and treaty compliance monitoring.
	• Develop and demonstrate advances in U.S. capabilities to detect and characterize foreign nuclear programs, especially in denied areas as follows:
	  o Advance sensor and algorithm development and demonstrate technologies and methods in operational testbed environments for SNM production detection;
	  o Understand the impact of alternative manufacturing techniques and advance stand-off detection methods for weaponization activities to monitor the potential technical breakout of foreign weapons programs; Develop new analytic approaches to move proliferation detection to earlier timelines and close information gaps in denied areas.
	• Develop, maintain, and upgrade national-level testbeds to provide operational environments advance capabilities exploiting nonproliferation signatures and validating end-to-end predictive capabilities for SNM production and weaponization activities.
	• Develop and demonstrate capabilities supporting nuclear security, including an integrated approach to broadened strategic arms control & verification R&D to identify key technologies considering emerging threats. Develop and demonstrate advances in U.S. capabilities to strengthen nuclear security across the threat spectrum as follows:
		• Decrease reflects completion of equipment purchases and change in SRNL O&M funding mechanism.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Support an emerging and disruptive technologies initiative focused on building expertise with emerging technologies in the context of varied nuclear nonproliferation missions, to prevent technological surprise and provide opportunities to support nonproliferation and national security more broadly.	○ Advance detection and imaging for SNM detection, develop and ○ Advance safeguards technology and address nuclear data gaps in support of nuclear security. • Support three university consortia to address basic gaps in nuclear nonproliferation and treaty compliance monitoring • Advance data science, remote detection, near-field, and other crosscutting technologies. Support an emerging and disruptive technologies initiative focused on building expertise with emerging technologies in the context of varied nuclear nonproliferation missions, to prevent technological surprise and provide opportunities to support nonproliferation and national security more broadly.	

Description

The Nuclear Detonation Detection (NDD) subprogram develops and builds space sensors for the Nation's operational nuclear test treaty monitoring and related capabilities; produces and updates the regional geophysical datasets and analytical understanding of waveform and radionuclide signatures to enable operation of the nation's ground-based nuclear detonation monitoring networks; and supports activities to improve U.S. capabilities to detect and characterize low-yield and evasively conducted underground nuclear explosions.

Highlights of the FY 2024 Budget Request

- Produce nuclear detonation detection satellite payloads in accordance with the negotiated schedule with the Department of the Air Force.
- Support the payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads in accordance with host satellite schedules.
- Conduct research in seismic and radionuclide detection to support national capability in terrestrial and airborne monitoring and analysis methods.
- Align with new National Security Memorandum-7 requirements for early detection of nuclear proliferation by conducting low-yield nuclear explosion monitoring field experiments.

FY 2022 Accomplishments

- After successful December 2021 launch by the USSF of Space Test Program satellite, conducted the on-orbit testing and normal operations readiness review of the SABRS-3 nuclear detonation detection sensor and the SENSER risk reduction R&D payload.
- Built and delivered to the USSF a suite of test assets that emulate the connections between the next-generation space-based payloads and their future Global Positioning System satellite host.
- Partnered with the National Aeronautical and Space Administration (NASA) in a demonstration – validation experiment to gain experience fielding new technology sensors in space on compressed timescales.
- Developed the Low-Yield Nuclear Monitoring (LYNM) testbed for future radioactive tracer and chemical high explosive experiments to improve understanding of signatures associated with evasively conducted low-yield underground nuclear tests. Successfully executed Electromagnetic Experiment 2022 at the testbed simulating an electromagnetic signature of an underground nuclear test.
- Began development of a testbed for experiments to enable comparison of explosively driven seismic waves with the seismicity of the very shallow 1993 Rock Valley earthquake at the Nevada National Security Site (NNSS).

Nuclear Detonation Detection

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Detonation Detection $279,205,000	**Nuclear Detonation Detection $285,603,000**	**Nuclear Detonation Detection +$6,398,000**
• Fabricate Global Burst Detector (GBD) nuclear detonation detection payloads and test assets for Global Positioning System (GPS) block IIIF satellites in accordance with the negotiated schedule with the Department of the Air Force. • Support payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads. • Develop and produce sensor-laden payloads for launch into geosynchronous orbit. • Conduct required engineering development and satellite interface coordination to support payload design updates for future satellite blocks for GBDs and other U.S. Nuclear Detonation Detection System payloads. • Improve capabilities of geophysical models, datasets, and analyses of seismic signals from underground detonations and improve technologies to detect radionuclide releases, including integrating research products of field and laboratory test campaigns into methods to improve event discrimination and yield estimation. • Support a new testbed to support field experiments associated with the Low Yield Nuclear Monitoring (LYNM) effort, designed to improve U.S. capabilities to detect and characterize low yield and evasively conducted underground nuclear explosions. • Support Source Physics Experiment III, aiming to improve the capability to discriminate	• Develop, produce, and deliver sensor payloads hosted on GPS and geosynchronous space vehicles to fulfill requirements for United States Nuclear Detonation Detection System (USNDS) mission; and fabricate and deliver three GBD payloads and test assets to the United States Space Force (USSF) for integration on GPS block IIIF satellites. Support payload-side technical integration, pre-launch, and on-orbit testing activities for previously delivered payloads. Develop and produce sensor-laden payloads for launch into geosynchronous orbit. Conduct required engineering development and satellite interface coordination to support payload design updates for future satellite blocks for GBDs and other USNDS payloads. • Advance nuclear detonation monitoring network capabilities of ground-based systems, including seismic, infrasound, hydroacoustic, and radionuclide signatures. • Exploit national-level testbeds to advance capabilities for global detection and characterization of low-yield or evasive nuclear testing. • Support field experiments associated with the LYNM effort. • Support Source Physics Experiment III, aiming to improve the capability to discriminate underground nuclear explosions from natural earthquakes.	• The increase reflects space-based sensor production needs in preparation for deliveries to the USSF and planned programmatic phasing of experimental and research activities in low-yield nuclear monitoring field experiments.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
underground nuclear explosions from natural earthquakes.		

Description

The Forensics R&D subprogram supports the R&D that develops and maintains advanced technical nuclear forensics analysis capabilities at the national laboratories that can support time-critical decisions in the event of a nuclear or radiological incident and assist in determining the origin of interdicted materials or nuclear devices. The subprogram's R&D includes the collection, analysis, and evaluation of pre-detonation and post-detonation nuclear and other radioactive materials, devices, and debris, as well as the immediate effects created by a nuclear detonation. It also sustains subject matter expertise to support exercises, mentoring, training, expert reach-back, and real-world contingency operations.

As part of DNN R&D's University Consortia for Nuclear Nonproliferation, the subprogram supports one consortium which links universities and DOE national laboratories to address basic research shortfalls in science, engineering, and other disciplines relevant to NNSA's technical nuclear forensics missions. All currently funded consortia have a Minority Serving Institution (MSI) component and will place a particular emphasis on encouraging the participation of HBCU and other MSIs through planned FOA.

Highlights of the FY 2024 Budget Request

- Develop advanced technical nuclear forensics analysis capabilities that support U.S. Government response to a nuclear or radiological event.
- Support the nuclear forensics R&D university consortium, as part of DNN R&D's University Consortia for Nuclear Nonproliferation, established in FY 2022 to conduct research and development in science, engineering, and other disciplines to address basic research shortfalls and train the next generation of experts needed to support NNSA's technical nuclear forensics missions.

FY 2022 Accomplishments

- Analyzed legacy nuclear test fallout debris samples and conducted SNM irradiation experiments at the Nuclear Criticality Experiments Research Center, located at NNSS to improve post-detonation nuclear forensics models.
- Identified new signatures of diagnostic methods that inform process history by combining modeling, advanced analytical techniques, and empirical observation.
- Issued FOA to award the nuclear forensics R&D university consortium (award completed in FY 2023).

Forensics R&D

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Forensics R&D $44,414,000	**Forensics R&D $44,759,000**	**Forensics R&D +$345,000**
• Improve technical nuclear forensic capabilities, including the technical means to assess bulk samples of SNM and the technical preparedness for scenarios of surface-interacting nuclear detonations. • Address research priorities that support the technical capability of operational assets and verification and validation activities. • Improve the process to generate actionable information from laboratory measurements, modeling efforts, and expert evaluations in the analysis of fallout debris samples following a nuclear detonation. • Reduce timelines and uncertainties in priority measurements. • Inform future capability requirements by assessing the benefits of incorporating emerging technical methods during operational exercises, baseline assessments, and other targets of opportunity. • Support a nuclear forensics R&D university consortium, partnered with DOE national laboratories, to conduct research and development in science, engineering, and other disciplines to address basic research shortfalls and train the next generation of experts needed to support NNSA's technical nuclear forensics missions.	• Develop and maintain advanced technical nuclear forensics analysis capabilities at the national laboratories. • Execute nuclear forensics R&D university consortium conducting R&D to address basic research shortfalls and train the next generation of experts in technical nuclear forensics missions.	• No significant change.

Defense Nuclear Nonproliferation Research and Development
Nonproliferation Stewardship Program

Description

The Nonproliferation Stewardship Program (NSP) subprogram employs a focused and prioritized strategy, deliberate planning, and dedicated resources to ensure foundational technical competencies at DOE/NNSA are sustained and available to support the Nation's nonproliferation missions. The NSP recognizes that the U.S. nuclear weapons program and domestic nuclear fuel cycle infrastructure has significantly narrowed or declined since the Cold War era, leaving the Nation without the large cadre of DOE/NNSA laboratory personnel with hands-on experience in sensitive fuel-cycle processes and nuclear weapons development and testing. At the same time, advances in manufacturing, computing, and other key areas, combined with easier access to nuclear-related information, are creating more diverse pathways to developing a nuclear weapon and have reduced and evolved the footprint and associated signatures of those activities. The convergence of these trends coupled with the continued threat of covert proliferation is making the task of nuclear nonproliferation more difficult. To ensure the technical agility needed to support nonproliferation missions and anticipate threats, the NSP sustains and develops foundational nonproliferation technical competencies by providing targeted, long-term support for enabling infrastructure, S&T, and an expert workforce.

Highlights of the FY 2024 Budget Request

- Support experimental capabilities and testbed development needed to address immediate capability shortfalls in support of nonproliferation missions.
- Support additional targeted, long-term activities to ensure the Nation is prepared to meet future nonproliferation goals and anticipate threats through relevant S&T, testbeds and research environments, and modern expertise needed for high-priority nonproliferation applications, including nonproliferation competencies in uranium and plutonium sciences and weaponization sciences and engineering.
- Build-back and upgrades of laboratory space and equipment as part of the Uranium Sciences and Technology Center that establishes a modern science and technology environment to develop technical expertise.

FY 2022 Accomplishments

- Manufactured and installed next generation test articles (Lot-2) at a joint DTRA-DNN R&D counter- and nonproliferation testbed.
- Completed two data centers to provide high-performance computing capability to develop next-generation uranium enrichment models and technical expertise.
- Released an "alpha" 2-D centrifuge model and a "beta" centrifuge cascade model to interagency partners to evaluate their predictive capabilities against real world test cases.
- Completed the demolition and initiated the reconstitution of four state-of-the-art laboratories to steward uranium conversion and handling competencies in the nuclear enterprise.
- Initiated a critical plutonium initiative to invigorate material production and handling competencies essential to deploy with confidence new reactor technologies and mitigate nuclear proliferation risks.

Nonproliferation Stewardship Program

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nonproliferation Stewardship Program **$125,000,000**	**Nonproliferation Stewardship Program** **$107,437,000**	**Nonproliferation Stewardship Program** **-$17,563,000**
• Support testbed development addressing immediate capability shortfalls in support of nonproliferation missions. • Support infrastructure upgrades and hardware initiatives to create a comprehensive, physics-based computational model that can predict the output of an entire uranium enrichment system based on the specific design of a single machine. • Support additional targeted, long-term activities building foundational technical competencies needed for high-priority nonproliferation applications, including in weaponization, by developing testbeds and research environments, conducting relevant S&T, and building modern expertise. • Conduct annual reviews evaluating progress toward building foundational nonproliferation technical competencies.	• Conduct testbed development critical to nonproliferation technical capabilities, including supporting infrastructure, and manufacture of machines. • Advance science of enrichment technologies, including upgrades and hardware for predictive system-level model and development and validation of predictive modeling. • Support additional long-term activities building foundational technical competencies needed for high-priority nonproliferation applications, including uranium and plutonium sciences and weaponization, by developing research environments, establishing pilot-scale uranium material processing, conducting S&T activities, and building modern expertise.	• Decrease reflects the early completion of Phase 1 of the Uranium Science and Technology Center testbed.

Defense Nuclear Nonproliferation Research and Development
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	82,606	88,636	94,752	+6,116
Hot-Cell Centrifugal Contactors, PNNL	5,800	0	0	0	5,800	+5,800
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**82,606**	**88,636**	**100,552**	**+11,916**

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	99,149	101,231	103,357	105,527	N/A
Total, Capital Equipment (including MIE)	**99,149**	**101,231**	**103,357**	**105,527**	**N/A**

Nonproliferation Construction

Overview

The Nonproliferation Construction Program consolidates construction projects that directly contribute to reducing global nuclear security threats and is a key component of the Department of Energy (DOE), National Nuclear Security Administration's (DOE/NNSA) integrated nonproliferation, counterterrorism, and emergency response strategy.

DOE/NNSA pursues a dilute and dispose strategy to fulfill the U.S. commitment to dispose of material declared excess to defense needs, which includes NNSA's 34 metric tons (MT) of plutonium and some of the DOE Office of Environmental Management's 6 MT of plutonium. The dilute and dispose strategy consists of blending plutonium with an inert mixture, packaging it for safe storage and transport, and disposing of it in a geologic repository. The Surplus Plutonium Disposition (SPD) project will add additional glovebox capacity at the Savannah River Site (SRS) to accelerate plutonium dilution and aid in the removal of plutonium from the state of South Carolina. Additionally, a Pit Disassembly and Processing (PDP) project will provide expanded pit disassembly, processing, characterization, and storage capabilities necessary to support the 34 MT mission.

Nonproliferation Construction
Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Nonproliferation Construction					
U.S. Construction					
18-D-150, Surplus Plutonium Disposition Project (SPD), SRNS					
SPD Other Project Costs (OPC)	*10,216*	*1,279*	*22,746*	*+21,467*	*1678.4%*
SPD Total Estimated Cost (TEC)	*145,784*	*70,485*	*54,465*	*-16,020*	*-22.7%*
Subtotal, 18-D-150, Surplus Plutonium Disposition Project	**156,000**	**71,764**	**77,211**	*+5,447*	***7.6%***
Subtotal, U.S. Construction	**156,000**	**71,764**	**77,211**	***+5,447***	***7.6%***
Total, Nonproliferation Construction	**156,000**	**71,764**	**77,211**	***+5,447***	***7.6%***

Nonproliferation Construction
Outyear Funding

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Nonproliferation Construction				
U.S. Construction				
18-D-150 Surplus Plutonium Disposition Project				
SPD Total Estimated Cost (TEC)	*35,000*	*60,000*	*55,672*	*16,202*
SPD Other Project Costs (OPC)	*18,080*	*5,000*	*5,000*	*10,000*
Subtotal, 18-D-150 Surplus Plutonium Disposition Project	**53,080**	**65,000**	**60,672**	**26,202**
25-D-XXX, Pit Disassembly and Processing (PDP) Project				
PDP Total Estimated Cost (TEC)	*49,164*	*156,122*	*243,328*	*259,798*
PDP Other Project Costs (OPC)	*0*	*0*	*0*	*0*
Subtotal, 25-D-XXX, Pit Disassembly and Processing (PDP) Project	**49,164**	**156,122**	**243,328**	**259,798**
Subtotal, U.S. Construction	**102,244**	**221,122**	**304,000**	**286,000**
Total, Nonproliferation Construction	**102,244**	**221,122**	**304,000**	**286,000**

Nonproliferation Construction Projects
Explanation of Major Changes
(Dollars in Thousands)

	FY 2024 Request vs FY 2023 Enacted ($)
Nonproliferation Construction Projects	
U.S. Construction:	
18-D-150, Surplus Plutonium Disposition (SPD) Project: Increase supports the additional design activities identified from the Technical Independent Project Review (TIPR).	+5,447
Total, Nonproliferation Construction Projects	+5,447

Nonproliferation Construction
U.S. Construction

Description
The Nonproliferation Construction program pursues the dilute and dispose strategy to fulfill the U.S. commitment to dispose of 34 MT of plutonium. The dilute and dispose strategy consists of blending plutonium with an inert mixture, packaging it for safe storage and transport, and disposing of it in a geologic repository. The SPD project will add additional glovebox capacity at the SRS to increase plutonium dilution throughput and aid in the removal of plutonium from the state of South Carolina. In addition, the PDP project will provide the expanded capability to disassemble excess nuclear weapon cores, or "pits," and convert the resulting plutonium metal into an oxide at the scale necessary to dispose of 34 MT of plutonium.

In the fourth quarter of FY 2022, DOE/NNSA implemented a risk-informed plan to achieve CD-2/3 for the SPD project. The new plan includes a delay in completing final design to FY 2023 and delays CD-2/3 from FY 2022 to FY 2024. The plan includes an updated acquisition strategy in which the M&O contractor will augment the design phase with sub-contractors. A DOE/NNSA team conducted a Technical Independent Project Review (TIPR) of the project's design, cost, and schedule. The TIPR identified that the project needed additional design efforts to validate the safety-related Fire Protection System and the Active Confinement Ventilation System. In parallel, DOE/NNSA and the contractor prepared a revised risk-informed estimate of the cost and schedule range to achieve CD-4. Additional funding in the outyears is needed to support the revised risk-informed plan. Therefore, NNSA is increasing the total project cost by $155 million resulting in a corresponding increase to the high-end of the cost range which is $775 million; and extending the CD-4 completion date to 4Q FY 2030. The increases in cost and schedule are necessary to account for: design, safety basis, and construction complexities of integrating the new mission into the existing facility and operations; technical complexity of the fire protection and ventilation system for the volume of material to be processed; escalation rates for labor and material being experienced by NNSA and projected by multiple authoritative sources; difficulty finding sufficient, skilled staffing for a complex nuclear project, a challenge encountered across multiple NNSA projects; internal competition for skilled professional and craft labor that will occur at the Savannah River Site when this project is under construction; and additional costs for operator training. The TPC and funding profile will be formally established when the project is baselined at CD-2/3 per DOE O 413.3B. Funding changes are reflected in the Construction Project Data Sheet: Financial Schedule (Section 3), Details of Project Cost Estimate (Section 4), and Schedule of Appropriation Request (Section 5).

NNSA achieved CD-0 for the PDP Project and NNSA initiated an Analysis of Alternatives (AoA) in September 2021 to evaluate options to expand PDP to address the capability gap. The AoA was completed in October 2022 and considered multiple locations across the DOE complex to site the project. NNSA is currently assessing the results along with other factors to determine the next steps for oxide production capability. Funding through the FYNSP may need to be adjusted depending on the outcome of this evaluation.

Other Project Cost (OPC)
This activity supports all other costs related to a project that are not included in the total estimated cost (TEC). OPCs include, but are not limited to research and development, conceptual design and conceptual design report, cold start-up and commissioning costs, National Environmental Policy Act (NEPA) documentation, project data sheet preparation, siting, and permitting requirements. These costs are part of the approved baseline and the total project cost (TPC) of the project.

Total Estimated Costs (TEC)
This activity supports the design, long-lead equipment procurement, site preparation, and construction of the project.

Highlights of the FY 2024 Budget Request
- Complete final design to support CD – 2/3, Approve Performance Baseline/Approve Start of Construction, for the SPD Project.

FY 2022 Accomplishments
- Completed financial and contractual closeout activities on the mixed oxide (MOX) fuel fabrication facility (MFFF) project.

- Completed 75% design for the SPD project.
- Began fabricating glovebox 1 of 3 in August 2022 and took receipt of all High Efficiency Particulate Air (HEPA) filter housings included in the SPD Project's CD-3A Phase 2 *long-lead equipment* scope.
- Received approval of CD-3A Phase 3 *additional early site preparation* in August 2022 and started construction in September 2022 for the SPD project.

U.S. Construction

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
U.S. Construction $71,764,000	**U.S. Construction $77,211,000**	**U.S. Construction +$5,447,000**
18-D-150, Surplus Plutonium Disposition (SPD) Project $71,764,000	**18-D-150, Surplus Plutonium Disposition (SPD) Project**	**18-D-150, Surplus Plutonium Disposition (SPD) Project**
SPD OPC $1,279,000	**SPD OPC $22,746,000**	**SPD OPC +$21,467,000**
• Supports activities such as project management and project controls support, procurement support, design authority activities, operations and security support, and start-up planning.	• Supports activities such as project management and project controls support, procurement support, design authority activities, operations and security support, and start-up planning.	• Increase supports the Technical Independent Project Review (TIPR) related Design Authority needs that will increase due to the two primary systems – Fire Suppression System and Active Confinement Ventilation System – that require additional design justification process improvement.
SPD TEC $70,485,000	**SPD TEC $54,465,000**	**SPD TEC -$16,020,000**
• Complete the fabrication, receipt, inspection and acceptance of long-lead procurements. • Complete final design for CD-2/3.	• Receive the two remaining gloveboxes and diesel generator from the CD-3A Phase 2 long-lead equipment scope. • Complete construction for the CD-3A Phase 3 additional early site preparation scope. • Obtain final design approval for CD-2/3. • Obtain Earned Value Management System (EVMS) certification. • Obtain approval of CD-2/3.	• Decrease reflects the completion of awarding long-lead procurements associated with Critical Decision (CD) – 3A Phase 2 and the completion of final design work required to support CD 2/3, Approval of Performance Baseline and Start of Construction.

Nonproliferation Construction
Construction Projects Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
25-D-XXX Pit Disassembly and Processing (PDP) Project[a]						
Total Estimated Cost (TEC)	TBD	0	0	0	0	0
Other Project Cost (OPC)	TBD	0	0	0	0	0
Total Project Cost, 25-D-520 Pit Disassembly and Processing (PDP) Project	**TBD**	**0**	**0**	**0**	**0**	**0**
18-D-150 Surplus Plutonium Disposition Project, SRS						
Total Estimated Cost (TEC)	609,608	172,000	145,784	70,485	54,465	-16,020
Other Project Cost (OPC)	165,392	93,071	10,216	1,279	22,746	+21,467
Total Project Cost, 18-D-150 Surplus Plutonium Disposition Project, SRS	**775,000**	**265,071**	**156,000**	**71,764**	**77,211**	**+5,447**
Total All Construction Projects						
Total Estimated Cost (TEC)	TBD	172,000	145,784	70,485	54,465	-16,020
Other Project Cost (OPC)	TBD	93,071	10,216	1,279	22,746	+21,467
Total Project Cost (TPC) All Construction Projects	**TBD**	**265,071**	**156,000**	**71,764**	**77,211**	**+5,447**

[a] Critical Decision (CD)-0 was approved on July 2021 for the Pit Disassembly and Processing (PDP) project with an estimated rough order-of-magnitude (ROM) range from $1 billion to $3.4 billion. An independent cost review was conducted by the NNSA Office of Cost Estimating and Program Evaluation (CEPE) that supported the ROM cost range. The funding profile for future years will be updated when estimates are validated and a baseline is approved through the CD process.

Outyears for Nonproliferation Construction

	($K) FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
25-D-XXX Pit Disassembly and Processing (PDP) Project					
Total Estimated Cost (TEC)	49,164	156,122	243,328	259,798	TBD
Other Project Cost (OPC)	0	0	0	0	TBD
Total Project Cost, 25-D-520 Pit Disassembly and Processing (PDP) Project	**49,164**	**156,122**	**243,328**	**259,798**	**TBD**
18-D-150 Surplus Plutonium Disposition Project, SRS					
Total Estimated Cost (TEC)	35,000	60,000	55,672	16,202	0
Other Project Cost (OPC)	18,080	5,000	5,000	10,000	0
Total Project Cost, 18-D-150 Surplus Plutonium Disposition Project, SRS	**53,080**	**65,000**	**60,672**	**26,202**	**0**
Total All Construction Projects					
TEC	84,164	216,122	299,000	276,000	TBD
OPC	18,080	5,000	5,000	10,000	TBD
TPC All Construction Projects	**102,244**	**221,122**	**304,000**	**286,000**	**TBD**

18-D-150, Surplus Plutonium Disposition (SPD)
Savannah River Site, Aiken, South Carolina
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary: The FY 2024 Request for the Surplus Plutonium Disposition (SPD) project is $77,211,000. The high end of the cost range approved at Critical Decision (CD)-1 is $620,092,000. A Federal Project Director Level II has been assigned to this project and has approved this Construction Project Data Sheet. Funding for this project is controlled at the Total Project Cost (TPC) level. Appropriations may be used for design, construction, or other project costs (OPC).

Significant Changes[a]
DOE/NNSA initiated this project in FY 2018. The most recent DOE-approved CD for the project is CD-3A Phase 3, Additional Early Site Preparations, which was approved on August 23, 2022.

In FY 2022, the project:
- Reached 75 percent design complete.
- Started fabricating glovebox 1 of 3 in August 2022, and all High Efficiency Particulate Air (HEPA) filter housings were received that were part of the CD-3A Phase 2, Long-lead Equipment, scope.
- Received HQ approval of CD-3A Phase 3, Additional Early Site Preparation, on August 23, 2022.
- Continued progressing the final design and documentation necessary to reach CD-2/3.

In the fourth quarter of FY 2022, DOE/NNSA implemented a risk-informed plan to achieve CD-2/3 for the SPD project. The new plan includes a delay in completing final design to FY 2023 and delays CD-2/3 from FY 2022 to FY 2024. The plan includes an updated acquisition strategy in which the M&O contractor will augment the design phase with sub-contractors. A DOE/NNSA team conducted a Technical Independent Project Review (TIPR) of the project's design, cost, and schedule. The TIPR identified that the project needed additional design efforts to validate the safety-related Fire Protection System and the Active Confinement Ventilation System. In parallel, DOE/NNSA and the contractor prepared a revised risk-informed estimate of the cost and schedule range to achieve CD-4. Additional funding in the outyears is needed to support the revised risk-informed plan. Therefore, NNSA is increasing the total project cost by $155 million. This increase correspondingly increases the high-end of the cost range to $775 million and extends the CD-4 completion date to 4Q FY 2030. The increases in cost and schedule are necessary to account for: design, safety basis, and construction complexities of integrating the new mission into the existing facility and operations; technical complexity of the fire protection and ventilation system for the volume of material to be processed; escalation rates for labor and material being experienced by NNSA and projected by multiple authoritative sources; difficulty finding sufficient, skilled staffing for a complex nuclear project, a challenge encountered across multiple NNSA projects; internal competition for skilled professional and craft labor that will occur at the Savannah River Site when this project is under construction; and additional costs for operator training. The TPC and funding profile will be formally established when the project is baselined at CD-2/3 per DOE O 413.3B, *Program and Project Management for the Acquisition of Capital Assets*. Funding changes are reflected in the Financial Schedule (Section 3), Details of Project Cost Estimate (Section 4), and Schedule of Appropriation Request (Section 5).

Additionally in FY 2023, the project will:
- Receive the first glovebox from the CD-3A Phase 2, Long-lead Equipment, scope.
- Continue the field work for the CD-3A Phase 3, Additional Early Site Preparation, scope.
- Continue progress towards obtaining Earned Value Management System (EVMS) certification.
- Complete nuclear safety and criticality documentation and submit to Safety Basis Approval Authority.
- Complete environmental documents and permits, and fire protection documents.

[a] Funding and schedules shown throughout the CPDS are estimates and consistent with the revised risk-informed plan and will be updated upon approval of the validated CD-2/3 baseline.

- Complete Final Design to enable an External Independent Review (EIR) and Independent Cost Estimate (ICE) to establish the Performance Measurement Baseline (PMB).

In FY 2024, the project will:
- Receive the two remaining gloveboxes and diesel generator from the CD-3A Phase 2, Long-lead Equipment, scope.
- Complete construction for the CD-3A Phase 3, Additional Early Site Preparation, scope.
- Obtain EVMS certification.
- Obtain approval of CD-2/3 Approval of Performance Baseline and Start of Construction, and start construction on project scope not authorized by CD-3A.
- Obtain approval from the Head of Field Element for the environmental documents and permits, and fire protection documents.
- Obtain approval from the Safety Basis Approval Authority for the nuclear safety and criticality documentation.
- Complete the operations plan and final vulnerability and dose assessments.
- Continue risk and project management, plan for testing, start-up, and operations.

The funding profile for future years will be updated when the estimates are validated, and a baseline has been approved as part of the CD process.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2018	10/31/1997	2/2/2017	3Q FY 2018	1Q FY 2022	4Q FY 2021	1Q FY 2022	N/A	4Q FY 2027
FY 2019	10/31/1997	2/2/2017	4Q FY 2018	4Q FY 2022	4Q FY 2021	4Q FY 2022	N/A	4Q FY 2027
FY 2020	10/31/1997	2/2/2017	1Q FY 2020	4Q FY 2022	4Q FY 2021	4Q FY 2022	N/A	4Q FY 2028
FY 2021	10/31/1997	9/30/2019	12/19/2019	4Q FY 2022	4Q FY 2021	4Q FY 2022	N/A	2Q FY 2028
FY 2022	10/31/1997	9/30/2019	12/19/2019	4Q FY 2022	2Q FY 2022	4Q FY 2022	N/A	2Q FY 2028
FY 2023	10/31/1997	9/30/2019	12/19/2019	4Q FY 2023	2Q FY 2023	4Q FY 2023	N/A	2Q FY 2028
FY 2024	10/31/1997	9/30/2019	12/19/2019	3Q FY 2024	3Q FY 2023	3Q FY 2024	N/A	4Q FY 2030

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete (d)
CD-3 – Approve Start of Construction
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Quarter or Date

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3A Phase 1	CD-3A Phase 2	CD-3A Phase 3
FY 2018	1Q FY 2022	1Q FY 2020	N/A	N/A	N/A
FY 2019	4Q FY 2022	4Q FY 2019	N/A	N/A	N/A
FY 2020	4Q FY 2022	2Q FY 2020	N/A	N/A	N/A
FY 2021	4Q FY 2022	2Q FY 2020	N/A	N/A	N/A
FY 2022	4Q FY 2022	2/13/2020	N/A	N/A	N/A
FY 2023	4Q FY 2023	12/21/2020	2/13/2020	12/21/2020	4Q FY 2022
FY 2024	3Q FY 2024	12/21/2020	2/13/2020	12/21/2020	8/23/2022

CD-3A Phase 1 – Early Site Preparations
CD-3A Phase 2 - Long Lead Procurements.
CD-3A Phase 3 – Additional Early Site Preparations

Project Cost History

Fiscal Quarter or Date

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2018	165,000	255,000	420,000	80,000	N/A	80,000	500,000
FY 2019	154,820	261,780	416,600	83,400	N/A	83,400	500,000
FY 2020	71,044	365,440	436,484	152,319	N/A	152,319	588,803
FY 2021	89,189	385,521	474,710	145,382	N/A	145,382	620,092
FY 2022	89,189	385,521	474,710	145,382	N/A	145,382	620,092
FY 2023	187,106	287,604	474,710	145,382	N/A	145,382	620,092
FY 2024	217,757	391,851	609,608	165,392	N/A	165,392	775,000

2. Project Scope and Justification

Scope

Approximately 15,000 ft^2 of processing space in the existing Hazard Category 2 K-Area Facility will be utilized for the project, which will expand the dilution capability. In addition, a 10,000 ft^2 support building will be located adjacent to the existing structure. To increase dilution throughput capacity, gloveboxes, equipment, and support systems (i.e., glovebox ventilation, fire suppression, glovebox rooms with airlocks, material control and accountability equipment, monitoring equipment, lag storage, etc.) will be installed in the existing K-Area Facility.

Justification

The mission of NNSA's Surplus Plutonium Disposition program is to remove plutonium from the State of South Carolina by providing processing, characterization, and storage capabilities to efficiently and permanently dispose of 34 metric tons of plutonium, thereby eliminating excess nuclear weapons materials.

It is a Departmental priority to remove specific inventories of plutonium from the State of South Carolina. Therefore, the removal of plutonium from Savannah River Site (SRS) for final disposition is a key objective of the program. Although the Dilute and Dispose strategy relies on mature technologies currently in use at DOE facilities, additional capacity is required to increase throughput in order to remove plutonium from SRS and meet NNSA's commitments to the state of South Carolina. This additional capacity will be provided by the SPD Project. The project includes new gloveboxes and associated process and process support equipment, and security features for the diluted plutonium product pending its eventual characterization, packaging, and shipment for disposal.

A quantitative risk analysis was completed to confirm a bounding cost range based on conceptual design. A Risk Management Plan (RMP) and a Risk and Opportunity Assessment Report (ROAR) were approved for the project and are updated as needed. The contingency included in this data sheet is consistent with the criteria found in the Association for Advancement of Cost Engineering International (AACEI) recommended practices and DOE G 413.3-21 for a Class 3 estimate.

In accordance with DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, an appropriate National Environment Policy Act (NEPA) review is required to support the project. DOE Order 413.3B requires final NEPA documentation prior to CD-2 for the project with a Record of Decision (ROD) after CD-2 approval, but prior to CD-3. In April 2015, DOE issued the *Surplus Plutonium Disposition Supplemental Environmental Impact Statement* (SPD SEIS, DOE/EIS-0283-S2). Although the SPD SEIS ROD does not contain a reference to the installation of any specific number of gloveboxes for the purpose of implementing the Dilute and Dispose strategy for the six metric tons (MT) of non-pit plutonium, the information contained in the *Savannah River Site and Los Alamos National Laboratory Timing and Throughput Assumptions Used for the Surplus Plutonium Disposition Supplemental EIS* (April 2015) indicates that installation and operation of three additional glovebox lines were analyzed as part of the development of the SPD Supplemental EIS. Because the installation of three additional glovebox lines for implementing the Dilute and Dispose strategy for the six metric tons (MT) of non-pit plutonium was previously analyzed and is consistent with the conceptual design for the SPD Project, no additional NEPA analyses or decisions are required to design, procure, and construct the SPD Project.
The SPD project is being conducted in accordance with the project management requirements in DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets, and has met all appropriate project management requirements to date.

Key Performance Parameters (KPPs)

Performance Measure[a]	Threshold	Objective
Dilution throughput capacity	1.5 metric tons per year	N/A

[a] Key Performance Parameters will be finalized upon approval of the project baseline.

3. Financial Schedule

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)[a]			
Design			
FY 2020	29,000	29,000	23,877
FY 2021	72,000	72,000	61,397
FY 2022	61,189	61,189	45,916
FY 2023	45,568	45,568	50,567
FY 2024	10,000	10,000	36,000
Total Design	**217,757**	**217,757**	**217,757**
Construction			
FY 2020	25,000	25,000	6,983
FY 2021	46,000	46,000	9,909
FY 2022	84,595	84,595	12,714
FY 2023	24,917	24,917	16,066
FY 2024	44,465	44,465	58,642
FY 2025	35,000	35,000	70,888
FY 2026	60,000	60,000	71,074
FY 2027	55,672	55,672	65,903
FY 2028	16,202	16,202	65,672
FY 2029	0	0	14,000
FY 2030	0	0	0
Total Construction	**391,851**	**391,851**	**391,851**
TEC			
FY 2020	54,000	54,000	30,860
FY 2021	118,000	118,000	71,306
FY 2022	145,784	145,784	58,630
FY 2023	70,485	70,485	66,633
FY 2024	54,465	54,465	94,642
FY 2025	35,000	35,000	70,888
FY 2026	60,000	60,000	71,074
FY 2027	55,672	55,672	65,903
FY 2028	16,202	16,202	65,672
FY 2029	0	0	14,000
FY 2030	0	0	0
Total TEC	**609,608**	**609,608**	**609,608**

($K)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Costs (OPC)[a]			
FY 2017[b]	5,750	5,750	4,039
FY 2018[a]	6,732	6,732	7,415
FY 2019	25,000	25,000	20,267
FY 2020[c]	25,000	25,000	21,241
FY 2021	30,589	30,589	13,238
FY 2022	10,216	10,216	10,669
FY 2023	1,279	1,279	18,482
FY 2024	22,746	22,746	5,012
FY 2025	18,080	18,080	5,035
FY 2026	5,000	5,000	10,026
FY 2027	5,000	5,000	10,005
FY 2028	10,000	10,000	13,963
FY 2029	0	0	10,500
FY 2030	0	0	15,500
Total, OPC	**165,392**	**165,392**	**165,392**
Total Project Costs (TPC)			
FY 2017	5,750	5,750	4,039
FY 2018	6,732	6,732	7,415
FY 2019	25,000	25,000	20,267
FY 2020	79,000	79,000	52,101
FY 2021	148,589	148,589	84,544
FY 2022	156,000	156,000	69,299
FY 2023	71,764	71,764	85,115
FY 2024	77,211	77,211	99,654
FY 2025	53,080	53,080	75,923
FY 2026[d]	65,000	65,000	81,100
FY 2027[d]	60,672	60,672	75,908
FY 2028[d]	26,202	26,202	79,635
FY 2029	0	0	24,500
FY 2030	0	0	15,500
Total TPC[d]	**775,000**	**775,000**	**775,000**

[a] Key Performance Parameters will be finalized upon approval of the project baseline.
[b] FY 2020 actual costs have been corrected from the FY 2022 CPDS to reflect the correct split between design and construction actual costs.
[c] Beginning in FY 2020 and forward, includes funds for early procurement of engineered equipment and site prep.
[d] TPC increase to support anticipated future project growth.

4. Details of Project Cost Estimate

	($K)		
	Current Total Estimate	**Previous Total Estimate**	**Previous Validated Baseline**
Total Estimated Cost (TEC)			
Design			
Design	196,766	150,106	
Contingency	20,991	37,000	
Total Design	**217,757**	**187,106**	**N/A**
Construction			
Site Work	53,128	27,255	
Long Lead Equipment	25,329	21,329	
Equipment	21,737	21,737	
Other Construction	249,606	157,511	
Contingency	42,051	59,772	
Total Construction	**391,851**	**287,604**	**N/A**
Total Estimated Cost (TEC)	**609,608**	**474,710**	**N/A**
Contingency, TEC	*63,042*	*96,772*	*N/A*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Planning	2,340	2,340	
Conceptual Design	25,905	25,905	
NNSA Other Direct Costs	24,610	19,600	
Execution/Start-up Phase	16,139	11,139	
Startup and Training	28,111	18,111	
CD-3A Phase-Support	7,430	7,430	
CD-3A Phase Design OPC Support	6,452	6,452	
Preliminary / Final Design Phase OPC Support	43,659	43,659	
Contingency	10,746	10,746	
Total OPC	**165,392**	**145,382**	**N/A**
Contingency, OPC	*10,746*	*10,746*	*N/A*
Total Project Cost[a]	**775,000**	**620,092**	**N/A**
Total Contingency (TEC+OPC)	***73,788***	***107,518***	***N/A***

[a] TPC increase to support anticipated future project growth.

5. Schedule of Appropriations Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
FY 2019	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	164,000	85,000	62,000	69,000	59,000	38,000	23,000	23,000	500,000
FY 2019	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	191,750	74,750	62,000	60,000	59,000	35,000	17,500	17,500	500,000
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	181,482	74,750	62,000	62,000	183,000	16,000	9,571	9,571	588,803
FY 2021	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	265,071	115,705	101,779	101,192	36,345	0	0	0	620,092
FY 2022	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	TBD	TBD	TBD	N/A	N/A	N/A	0
	TPC	265,071	156,000	TBD	TBD	TBD	199,021	0	0	620,092
FY 2023	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	265,071	156,000	71,764	92,257	35,000	N/A	N/A	N/A	620,092
FY 2024[a]	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
	TPC	265,071	156,000	71,764	77,211	53,080	65,000	60,672	26,202	775,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	1Q FY 2031
Expected Useful Life (number of years)	20 years
Expected Future Start of D&D of this capital asset (fiscal quarter)	1Q FY 2051

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	58.3	58.3	1,166	1,166

7. D&D Information

Approximately 15,000 ft^2 of processing space in the existing Hazard Category 2 K-Area Facility will be required for the project. In addition, a 10,000 ft^{-2} new support building will be located adjacent to the existing structure. The new square footage is reported below. The MOX-T demolished about 34 temporary buildings. At a minimum, these two buildings would offset the new area being constructed: 285-015F was 7,258 square feet and 717-045F was 8,540 square feet.

	Square Feet
New area being constructed by this project at Savannah River Site (K-Area).	10,000
Area of D&D in this project at Savannah River Site (K-Area).	N/A
Area at Savannah River Site (K-Area) to be transferred, sold, and/or D&D outside the project, including area previously "banked"	N/A
Area of D&D in this project at other sites	N/A
Area at other sites to be transferred, sold, and/or D&D outside the project, including area previously "banked"	15,798
Total area eliminated	N/A

8. Acquisition Approach

The acquisition strategy, which was developed as part of the CD-1 package, is with the M&O contractor for the design and construction of the SPD Project. The M&O contractor will employ other design and construction subcontractors as may be deemed of best value to the project.

Nuclear Counterterrorism and Incident Response Program

Overview

Among the Department of Energy/National Nuclear Security Administration's (DOE/NNSA) diverse nuclear security roles is the mission to counter the threat of nuclear terrorism and nuclear proliferation and respond to nuclear incidents and accidents worldwide. The Nuclear Counterterrorism and Incident Response (NCTIR) program not only ensures the Department's emergency preparedness and response, but also assesses nuclear and radiological threats and uses the scientific knowledge resident at the U.S. national laboratories to inform domestic and international policies and regulations, contingency planning, training, and international capacity-building. These activities strengthen national and international counterterrorism, counterproliferation, and nuclear incident response capabilities.

The NCTIR Program includes the following subprograms:

- The **Emergency Operations (EO) subprogram** provides both the structure and processes to ensure a comprehensive and integrated approach to emergency management and continuity of operations and enhance the resilience of the Department and the Nation. In addition, EO coordinates a whole-of-community approach to emergency management (to include mitigating, preventing, preparing for, responding to, and recovering from all-hazards emergencies), improving readiness and effectiveness of the DOE Comprehensive Emergency Management System on a programmatic and performance level, while promoting unity of effort and a culture of continuous improvement, and sustaining operations during a continuity event.

- The **Counterterrorism and Counterproliferation (CTCP) subprogram** reduces the threat of nuclear and radiological terrorism and proliferation through innovative science, technology, and policy solutions. Further, CTCP maintains capabilities to avert, respond to, or mitigate the consequences of nuclear and radiological incidents and accidents in the U.S. and abroad. The following subprograms support CTCP:

    - The Nuclear Incident Response (NIR) / Nuclear Emergency Support Team (NEST) subprogram provides flexible and effective response and technical reach-back capabilities for any nuclear/radiological incident or accident worldwide by applying the unique technical expertise in DOE/NNSA's nuclear security enterprise. These missions require that highly trained response personnel and specialized technical equipment are on continuous standby to deploy to provide an integrated response for counter-weapons of mass destruction (C-WMD) operations, radiological/nuclear public health emergencies, national exercises, security operations for National Special Security Events (NSSEs), U.S. nuclear weapon accidents, and other national significant events.

    - The National Technical Nuclear Forensics (NTNF) subprogram provides nuclear forensics technical and operational capabilities in response to nuclear/radiological incidents, including analysis of interdicted nuclear materials; device assessment; device disposition; and identifying and assessing high-value samples for the National Nuclear Material Archive (NNMA). These missions involve specialized personnel, equipment, and facilities as well as the use of sophisticated tools and techniques. In addition, the NTNF subprogram shares leadership of the interagency nuclear forensics mission, ensuring an integrated, coordinated U.S. Government nuclear forensics capability through strategic planning, program coordination, and continual capability improvement.

    - The Nuclear Incident Policy and Cooperation (NIPC) subprogram leverages DOE/NNSA's technical expertise to strengthen domestic and international partners' emergency preparedness and response capabilities for radiological or nuclear incidents and accidents. These activities exercise and expand state and local incident response capabilities and enable key international partners to effectively address radiological or nuclear incidents in their region.

    - The Nuclear Threat Science (NTS) subprogram provides the Nation's technical capability to understand and defeat nuclear threat devices, including improvised nuclear devices (IND), radiological dispersal devices (RDD), and lost or stolen foreign nuclear weapons, as well as to develop foundational technologies supporting nuclear counterproliferation efforts. The NTS subprogram maintains this technical capability by 1) assessing nuclear threat device concepts; 2) evaluating protection requirements for nuclear materials; 3) conducting classified Nuclear Threat Reduction (NTR) technical and policy exchanges with the United Kingdom and France; and 4) improving weapons of mass destruction (WMD) device defeat capabilities. Technical work on device assessment also supports the Department of Defense (DoD), Federal Bureau of Investigation (FBI), and Intelligence Community in policy, planning, analysis, and operational capabilities.

Nuclear Counterterrorism and Incident Response Program
Funding

($K)

Italics denotes reporting level	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Nuclear Counterterrorism & Incident Response Program					
Emergency Operations	**14,597**	**29,896**	**19,123**	**-10,773**	**-36.0%**
Counterterrorism and Counterproliferation					
Nuclear Incident Response / Nuclear Emergency Support	*207,700*	*236,472*	*259,088*	*+22,616*	+9.6%
National Technical Nuclear Forensics	*41,140*	*50,555*	*61,363*	*+10,808*	+21.4%
Nuclear Incident Policy and Cooperation	*10,200*	*12,067*	*13,309*	*+1,242*	+10.3%
Nuclear Threat Science	*97,145*	*140,980*	*140,660*	*-320*	-0.2%
Subtotal, Counterterrorism and Counterproliferation	**356,185**	**440,074**	**474,420**	**+34,346**	*+7.8%*
Total, Nuclear Counterterrorism & Incident Response Program	**370,782**	**469,970**	**493,543**	**+23,573**	**+5.0%**

Nuclear Counterterrorism and Incident Response Program
Outyear Funding

($K)

Italics denotes reporting level	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Nuclear Counterterrorism & Incident Response Program				
Emergency Operations	20,683	20,975	21,718	21,902
Counterterrorism and Counterproliferation				
Nuclear Incident Response / Nuclear Emergency Support Team	271,573	272,630	273,570	275,377
National Technical Nuclear Forensics	75,312	89,345	101,184	111,800
Nuclear Incident Policy and Cooperation	13,742	14,081	14,497	15,000
Nuclear Threat Science	144,965	146,489	147,886	149,245
Subtotal, Counterterrorism and Counterproliferation	**505,592**	**522,545**	**537,137**	**551,422**
Total, Nuclear Counterterrorism & Incident Response Program	**526,275**	**543,520**	**558,855**	**573,324**

Explanation of Major Changes
($K)

	FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Counterterrorism and Incident Response Program	
Emergency Operations: Decrease due to completion of some aspects of the CEOC renovation. Investments include infrastructure and supporting communications equipment, and classified communications system improvements in FY 2023.	**-10,773**
Counterterrorism and Counterproliferation: The increase supports major program priorities, including:	
Nuclear Incident Response/Nuclear Emergency Support Team: The increase provides increased NEST capacity to respond to various types of emergencies with particular focus on lessons-learned from the Ukraine crisis and related activities. If Ukraine remains a high-pace contingency operation, priorities will be adjusted to meet those demands. The increased capacity will also enhance and broaden the scope of NEST technical training to interagency partners in furtherance of expanded regional U.S. capabilities to secure and defeat WMD devices.	**+22,616**
National Technical Nuclear Forensics: The increase enables progress toward meeting new interagency NTNF requirements and bridges a long-standing gap between research and development activities and the operational capabilities in NTNF. Funding will also allow for the improvement of key NTNF mission areas, some of which are essential to meet USG demand during the Ukraine Crisis, as well as supports NTNF recapitalization and infrastructure improvements.	**+10,808**
Nuclear Incident Policy and Cooperation: The increase provides additional capacity for U.S. National Laboratory emergency response expertise to be made available for international capacity building activities.	**+1,242**
Nuclear Threat Science: No major changes.	**-320**
Total, Nuclear Counterterrorism and Incident Response Program	**+23,573**

Nuclear Counterterrorism and Incident Response Program
Emergency Operations

Description

The Emergency Operations (EO) subprogram is DOE's Office of Primary Interest (OPI) for several unique and mandated Emergency Management and Continuity functions, offices, and capabilities. The subprogram:

- Administers and manages the 24/7/365 CEOC.
- Serves as the emergency management focal point for all incidents, events, emergencies, emergency notifications, and reports.
- Oversees coordination of enterprise-wide emergency management policy, procedure, training, and exercise responsibilities.
- Executes Department-level responsibility for Continuity of Operations (COOP), Continuity of Government (COG), and Enduring Constitutional Government (ECG) programs.
- Implements Federal Mission Resilience Strategy and the tenets of EO 13961.
- Convenes and chairs the Emergency Management Advisory Committee.
- Manages and coordinates an Emergency Management Readiness Assurance program.
- Develops and maintains the DOE Enterprise Threat and Hazard Risk Profile.

The FY 2024 Budget Request will focus HQ EO activities and resources across the following subprograms:

- The Preparedness, Planning, and Readiness Assurance Program areas promote a whole-of-community approach to mitigate, prevent, prepare for, respond to, and recover from all-hazards events. This program area develops and implements emergency management policy, directives, guidance, and plans for DOE and NNSA; assists Headquarters, Field Elements, and facility contractors in implementing effective emergency management programs in compliance with DOE policies; and leads the exchange of Management and Operating (M&O) best practices via the Emergency Management Issues Special Interest Group (EMI-SIG).

- Incorporated within the preparedness, planning, and readiness assurance program area is the responsibility to implement, manage, and coordinate a readiness assurance program to execute the DOE emergency management program in accordance with directives, regulations, policies, and applicable laws. The program area develops, leads, and evaluates national level exercises, performs periodic oversight functions on behalf of Field Element Managers in accordance with the Chief of Defense Nuclear Safety, and facilitates cross-cutting emergency management related collaboration via the Federal Officials Emergency Management Advisory Committee (EMAC).

- The Continuity Program executes DOE and NNSA COOP, COG, and ECG programs to advance the National Continuity Policy and ensures availability and interoperability of continuity communications systems across DOE/NNSA. In addition, the subprogram, along with interagency partners, deploys continuity capabilities during "with-notice" or "no-notice" emergencies and NSSEs, including the Presidential Inauguration and State of the Union Address, and in accordance with Executive Order 13961, "Governance and Integration of Federal Mission Resilience," advances implementation of the three lines of effort outlined in the Federal Mission Resilience Strategy (FMRS) across the enterprise.

- The CEOC program operates and maintains the Department's Emergency Watch Office, a single point-of-contact regarding local and national emergencies, heightened international tension, Departmental emergencies, natural disasters, and acts of terrorism. The program ensures that the Secretary of Energy, the Deputy Secretary, the Administrator, Program Secretarial Officers, and Field and Site Managers are kept fully and currently informed about emergency matters, serves as the unifying and mission enabling element for emergency management, and staffs a cadre of Emergency Management Specialists responsible for whole-of-department emergency management support.

Highlights of the FY 2024 Budget Request

- Serve as the focal point for management and implementation of DOE and NNSA COOP, COG, and higher-level continuity programs.
- Advance integration of the FMRS and "Assess, Distribute, Sustain" mantra across the Department.
- Implement Executive Order 13961, "Governance and Integration of Federal Mission Resilience."
- Provide and maintain interoperability and availability of required continuity facilities, communications systems, and capabilities.
- Deploy and manage continuity capabilities during "with-notice" or "without-notice events" and NSSEs.
- Lead, manage, and operate the DOE/NNSA CEOC, providing situational awareness of emerging or evolving all-hazard events.
- Inform and provide situational awareness to DOE and NNSA senior leadership on all emergency matters.
- Expedite senior official access to White House-directed and interagency response secure conferencing needs.
- Lead current and future operational management of information and enables provision of a common operating picture related to events and incidents.
- Develop, lead, and evaluate national-level exercises for DOE and NNSA.
- Administer and chair the Federal Officials EMAC.
- Assist Headquarters, Field Elements, and facility contractors in implementing effective emergency management programs.
- Implement, manage, and coordinate Emergency Management Readiness Assurance Reporting Program.
- Advance emergency management, continuity of operations, higher-level continuity programs and technical qualification programs.
- Lead the update or revision of core DOE and NNSA emergency management documents, guides, and standards.
- Host and lead the annual EMI-SIG forum.
- Lead the design and development of DOE participation in key exercises, including Eagle Horizon.
- Ensure interoperability of emergency communications systems across DOE/NNSA and with interagency partners.
- Update and validate emergency management and continuity directives, guides, and technical planning basis standards.
- Enhance the security and resilience of the Department and Nation.

FY 2022 Accomplishments

- Led an October 2021 Senior Leader Facilitated Discussion with nearly 200 participants, as part of the annual Eagle Horizon continuity exercise series.
- Received final approval of DOE O 150.1B, *Continuity Programs,* establishing requirements for continuity programs for HQ offices, Field Elements, and contractors across the Department.
- Received final approval of DOE G 151.1-1B, *Comprehensive Emergency Management Guide,* completing a multi-year effort to provide approaches to emergency planning, preparedness, readiness assurance, and response activities at DOE/NNSA Sites, Facilities, and Activities, including DOE transportation activities, Field Elements, and HQ offices.
- Briefed all current successors through Executive Successor Briefings to Senior Leadership of both DOE and DOE/NNSA, providing information essential to the success of a Senior Leader elevating to the role of the acting Secretary.
- Advanced FMRS creation and initial implementation across the Department and the interagency.
- Engaged with DOE and NNSA Senior Leadership to develop an after-action report focused on the response to the initial phases of the invasion of Ukraine, and the Russian attack on the Zaporizhzhia Nuclear Power Plant.
- Developed and provided sensor monitoring capabilities to support DOE/NNSA's role in responding to the Russian invasion of Ukraine.
- Improved interoperability of continuity communications systems across DOE/NNSA and with interagency partners, attaining an 84 percent compliance rate as reported by the White House Office of Science and Technology Policy (OSTP) within the D-16-1 quarterly compliance reporting.
- Updated and validated emergency management and continuity orders, directives, guides, and technical planning basis standards.

- The Liaison Officer Cadre participated in 27 individual site visits and exercises across the Labs, Plants, Sites and Offices and accomplished observation and evaluation activities and developed critical relationships with personnel across the Emergency Management Enterprise.
- Hosted the 36th annual offering of the DOE-wide emergency management-based forum, referred to as the EMI-SIG to enable discussions on topics focused on preparedness, mitigation, response, and recovery.
- Completed a comprehensive Business Process Analysis and Business Impact Analysis of essential functions across DOE and DOE/NNSA. Tools developed from the data of both analyses will assist DOE and NNSA determine impacts to Primary Mission Essential Functions (PMEFs) and Mission Essential Functions (MEFs) during continuity events.
- In response to an April 2021 memorandum from the Homeland Security and Deputy National Security Advisor, updated the DOE PMEFs and MEFs through a comprehensive revalidation package reviewed Labs, Plants, Sites, and DOE/NNSA Site Offices.
- Developed and promulgated the FY 2021 Annual Report on the Status of the Department's Emergency Management System, capturing input from 39 sites, facilities, and activities within the DOE/NNSA enterprise, and reflecting readiness assurance results for DOE and NNSA entities.

Emergency Operations

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Emergency Operations $29,896,000	**Emergency Operations $19,123,000**	**Emergency Operations -$10,773,000**
• Provide emergency management expertise, leadership, and guidance across the entire DOE/NNSA emergency management enterprise. • Execute COOP and COG programs. • Operate and maintain the CEOC to receive, coordinate, validate, and disseminate emergency information to various DOE, NNSA, interagency, and other program offices and related entities. • Execute the design concept study for the CEOC renovation project. • Host the 37th annual Department-wide emergency management forum. • Reinstitute and strengthen the site liaison program in implementing revised DOE/NNSA emergency management and continuity orders, to include site training and exercises postponed during the COVID travel pause. • Provide two additional nodes to an unclassified communications network and improved support to classified communications systems. • Assess key site readiness assurance levels, culminating in the development and promulgation of the annual report for the Department's Emergency Management System, based on FY 2022 evaluations and submissions. • Refine and host the Unified Coordination Structure.	• Provide emergency management expertise, leadership, and guidance across the entire DOE/NNSA emergency management enterprise. • Execute COOP and COG Programs. • Address requirements associated with the Federal Mission Resilience Strategy. • Operate and maintain the CEOC to receive, coordinate, validate, and disseminate emergency information to various DOE, DOE/NNSA, interagency, and other program offices and related entities. • Host the 38th annual Department-wide emergency management forum. • Further develop and ingrain the liaison program in implementing DOE/NNSA emergency management and continuity orders, to include site training, exercises, and leadership engagements. • Train internal and external personnel and maintain services on continuity communications equipment installed the prior FY at both the unclassified and classified levels. • Support the annual service costs for the Temporary Emergency Exposure Limit (TEEL) relational database innovation.	• Decrease due to completion of some aspects of the CEOC renovation. Investments include infrastructure and supporting communications equipment, and classified communications system improvements in FY 2023.

Nuclear Counterterrorism and Incident Response Program
Counterterrorism and Counterproliferation

Description

The Counterterrorism and Counterproliferation (CTCP) subprogram provides technical expertise, practical tools, and scientifically informed policy recommendations to advance U.S. nuclear counterterrorism and counterproliferation objectives. CTCP focuses on nuclear and radiological incidents and accidents, with the core mission to prepare for and respond to such events.

The **Nuclear Incident Response/Nuclear Emergency Support Team (NIR/NEST)** subprogram serves as the Nation's last line of defense against nuclear or radiological incidents and accidents. Its mission is to apply the unique technical expertise within DOE/NNSA's nuclear security enterprise to prepare for, prevent, respond to, and, where possible, mitigate nuclear or radiological emergencies domestically and abroad. DOE/NNSA's strategic approach to incident response activities is to ensure a central point of contact and an integrated, flexible, scalable, and tailorable response to all radiological and nuclear emergencies.

This subprogram works closely with other DOE elements as well as partner federal organizations, including the Department of Homeland Security (DHS), the Federal Emergency Management Agency (FEMA), the Environmental Protection Agency (EPA), the Nuclear Regulatory Commission (NRC), DoD, FBI, and the Intelligence Community to provide technical assistance to respond domestically or abroad to nuclear and radiological emergencies, including terrorist threats involving nuclear materials, and to conduct exercises and provide support to the NEST programs to ensure safe incident resolution and the protection of public safety and the environment. CTCP accomplishes this mission by ensuring the appropriate infrastructure is in place to provide command, control, coordination, and communications of DOE/NNSA nuclear incident response assets. Incident response personnel must be properly organized, trained, and equipped to rapidly deploy in response to an incident.

Specialized NEST response teams are trained and equipped to execute a variety of national security and public health and safety missions, to include searching for, identifying, characterizing, defeating, and taking possession of a nuclear or radiological device; supporting the recovery of nuclear material outside of regulatory control; and providing preventative radiological and nuclear detection support to federal, state, and local public safety organizations for major public events. NEST provides technical support to the FBI to respond to WMD threats in the U.S., including specialized technology and training for regional teams to locate and identify radiological/nuclear devices and prevent these devices from detonating; NEST also provides such support to DoD for overseas responses to WMD threats.

Funding in the FY 2024 Request will address NEST public health and safety capability needs. NEST is also trained and equipped to support federal, state, and local entities' response to accidents and incidents involving the release of nuclear or radiological materials. These teams provide technical analysis to support protective action guidance – such as evacuation, shelter-in place, and medical treatment – during a radiological response. NEST analysis is based on predictive modeling of atmospheric dispersal, real-time radiological measurements, and the latest medical science.

This Budget Request reflects the sustainment of the expanded regional capabilities built in the first phase of the Capability Forward initiative, enabling regional FBI counter-WMD teams to take decisive action against a WMD device, and enhance 14 cities with decisive WMD defeat capabilities, accelerating life-saving responses to nuclear and radiological threats. This request also supports initial activities to implement a second phase of this initiative focused on continuing the expansion and enhancement of regional capabilities to secure and defeat WMD devices within all FBI field offices, enabled through a standardized NEST technical training program.

The **National Technical Nuclear Forensics (NTNF)** subprogram maintains the nuclear forensics technical and operational capabilities that support the U.S. Government nuclear forensics core mission areas of pre-detonation device, post-detonation, and pre-detonation materials analysis through implementation of specialized programs. The NTNF subprogram holds key roles in supporting ground sample collection, performing in-field sample processing, device disassembly, nuclear material analysis, and device assessment through reverse engineering.

The NTNF subprogram sustains mission readiness through training, drills, and exercises for responders, maintenance and development of highly sophisticated equipment, tools, and techniques, technical integration, and maintenance of specialized pre- and post-detonation response teams and facilities. Additionally, continued development of the National Nuclear Material Archive (NNMA) ensures high-value historical nuclear material samples are identified, prioritized, analyzed, and characterized. Comparative analysis of material characteristics significantly aids assessment of interdicted materials and thus enhances technical nuclear forensics capabilities for attribution.

The FY 2024 Budget Request supports the NTNF programs' development and maintains operational and scientific expertise at the national laboratories to provide whole-of-government nuclear forensics response activities and support to attribution. Credible nuclear forensics capabilities constitute an essential element of the Nation's nuclear deterrence strategy, helping to dissuade foreign states from supporting or facilitating non-state actors' acquisition of nuclear materials, either wittingly or unwittingly. National-level requirements to support nuclear forensics are outlined in presidential policies that specify interagency roles and responsibilities to maintain mission readiness and provide capabilities for operational response, analysis, and assessment in support of attribution. DOE/NNSA began applying resources in FY 2023 and will increase efforts in FY 2024 to meet new NTNF capability requirement goals, and will assess, in coordination with its interagency partners, the collective resources to meet requirements beyond FY 2024.

The **Nuclear Incident Policy and Cooperation (NIPC)** subprogram mission is to strengthen emergency preparedness and response for all radiological or nuclear incidents and accidents posing a potential risk to the U.S. territory, citizens, or interests. This subprogram works domestically with federal, state, and local officials to expand their capabilities to respond to radiological or nuclear incidents and accidents. As part of a robust strategy to protect the United States from potential radiological or nuclear threats, this program also cooperates with key international partners to strengthen their ability to effectively address radiological or nuclear incidents in their region—with or without U.S. involvement—as far from U.S. territory as possible.

The NIPC subprogram activities include technical exchanges, joint technical experiments, workshops, exercises, technical assistance and support, policy development, and training — in-person, hybrid, and virtual -- with partners. These activities address the full range of potential radiological or nuclear threats. This subprogram assesses global security trends, risks, and requirements annually to plan, prioritize, and implement radiological/nuclear counterterrorism and incident response joint activities.

The FY 2024 Budget Request sustains and expands preparedness training both domestically and internationally which contributes to the NNSA mission to strengthen emergency preparedness and response capabilities for Federal, State, local, and international stakeholders. This budget request will also provide complementary funding support to NNSA's unique NEST-related national laboratory capabilities, including but not limited to, international access to NARAC plume modeling, targeted training for key international, state, and local partners, and contributing support for the cytogenetics biodosimetry laboratory.

The **Nuclear Threat Science (NTS)** subprogram provides the nation's technical capability to understand and defeat nuclear threat devices, including INDs, RDDs, and lost or stolen foreign nuclear weapons. NTS maintains and advances this technical capability through partnerships with DOE/NNSA's nuclear weapons design laboratories and production facilities and through technical and policy exchanges with the United Kingdom and France. NTS also conducts focused science on explosive and nuclear material behaviors. In particular, NTS performs integrated experiments as part of risk assessments of nuclear materials and nuclear threat devices in support of interagency and international partners. Collectively, this work shapes the U.S. understanding of nuclear terrorism and nuclear proliferation threats. This understanding is used to support policies and procedures to improve nuclear material protection and the technical capabilities available for crisis operations.

The NTS subprogram informs policies and procedures across multiple departments and agencies and is coordinated across NNSA and within the U.S. interagency to ensure maximum alignment with agreed-upon joint goals and ongoing programs. This 2024 Budget Request will enhance U.S. national laboratory capabilities (e.g., modeling/simulation, tools, expertise) for highly specialized nuclear threat science assessments, while improving predictive capabilities in support of crisis operations. NTS will conduct scientific studies, including integrated experiments with the DOE/NNSA Office of Defense Programs, to ensure that material security and risk management policies and missions are informed by defensible and relevant assessments of potential threats. This subprogram will support the requirement to perform technical assessments in support of the Design Basis Threat (DBT) that governs DOE's nuclear material security posture. Similar technical expertise will support Defense Nuclear Nonproliferation (DNN) international nuclear security engagements by providing technical inputs for risk prioritization. This Budget Request also supports the technical work plans under the bilateral and trilateral classified channels that enable the sharing of best practices with foreign partners to reduce nuclear terrorism and nuclear proliferation risks.

Highlights of the FY 2024 Budget Request

- Ensure NEST is prepared to respond to radiological/nuclear incidents and accidents with highly trained and equipped personnel.
- Address NEST staffing shortfalls, improve operational integration and full spectrum training and exercises in accordance with interagency objectives, enable critical technology development and supporting infrastructure requirements, and meet coordinated program milestones and equipment recapitalization goals.
- Execute expanded domestic regional training for interagency partners focused on localizing radiological and nuclear threats and defeating radiological dispersal devices.
- Maintain and improve NEST capabilities internally and through coordination with interagency partners in planned and emergent training, exercises, and response operations.
- Provide security and assessment capabilities for nuclear threat device designs across the entire counterterrorism and counterproliferation mission space by evaluating nuclear threat device concepts and materials, developing and maintaining predictive modeling capabilities, and executing selected focused and integrated experiments.
- Evaluate unique nuclear technologies for counterterrorism and counterproliferation applications. Develop and validate tools, perform contingency planning efforts, implement training, and maintain expertise to support NNSA, DoD, and FBI capabilities for the counterterrorism and counterproliferation mission.
- Address a critical gap in nuclear counterproliferation with DOE/NNSA expertise and technology.
- Enable new approaches to inform and provide solutions to the U.S. Government to counter and disrupt nuclear proliferation.
- Address the demand for broader counterproliferation analysis and approaches which benefits U.S. partners.
- Increase capacity to perform assessments of nuclear threat device designs and materials in support of DoD strategic partnership.
- Maintain and develop technical and operational nuclear forensics capabilities and operational readiness through its nuclear forensics' programs.
- Serve as the technical lead for government-wide National Technical Nuclear Forensics efforts, including capability development, sustainment, assessment, and interagency coordination of critical and overarching program facets supporting the characterization and attribution of nuclear materials, devices, accidents, or an attack.
- Develop operational capabilities to maximize use of Design Heritage assessments for support to attributing origin of a device used in an attack.
- Expand national security work relevant to nuclear forensics at the national laboratories to rebuild diminishing essential nuclear forensics expertise and expertise in assessment of detonation prompt effects.
- Begin to address technical gaps in national laboratory capabilities to meet updated requirements for post detonation nuclear forensic assessments, particularly in assessment timelines.
- Increase participation in national level and interagency exercises and participation in international technical exchanges with U.S. allies.

- Conduct in-person, hybrid, and virtual trainings, technical exchanges, workshops, and exercises with domestic and foreign partners and international organizations to improve global capacity to respond to nuclear and radiological events.
- Strengthen domestic and international emergency preparedness and response through nuclear counterterrorism and incident response training, exercises, exchanges, and development of emergency management programs.
- Conduct analysis of radiological dispersal device experiments to improve response to such terror events.
- Expand international collaboration for medical response to radiological events.
- Develop new trainings and exercises to address emerging needs, combining virtual and in-person methods, and incorporating advanced learning techniques.

FY 2022 Accomplishments

- From the start of Russia's unprovoked, full-scale invasion of Ukraine, CTCP personnel were closely involved in the U.S. Government's response to the crisis. U.S. scientists assessed a wide range of potential nuclear and radiological scenarios that may occur in Ukraine to inform both the U.S. Government response and measures that U.S. allies would take to protect public health and safety in the region. CTCP procured and deployed remotely monitored radiation sensors to provide the U.S. Government with an independent system for real-time data in the event of a radiation release from a Ukrainian nuclear facility or other potential nuclear-related scenarios in the region.
- Identified safe and innovative ways in a pandemic environment to train and maintain NEST readiness to respond to a radiological or nuclear emergency, including nuclear forensics operations.
- Advanced U.S. nuclear threat reduction and emergency preparedness policy objectives through engagements with international organizations and foreign partners, bolstering global response capabilities and reinforcing mechanisms for cooperation.
- Conducted virtual and in-person trainings in partnership with the FBI to enhance emergency preparedness and response capabilities domestically.
- Designed five new virtual training courses and one new in-person exercise program to expand knowledge base for domestic and international radiological first responders.
- Conducted joint International Atomic Energy Agency (IAEA) training courses on incident and nuclear security preparedness and response.
- Conducted seven trainings to support nuclear security preparedness and response with the North Atlantic Treaty Organization (NATO).
- Conducted two bilateral International Medical Management of Radiological Injuries courses on effective medical response to radiological incidents.
- Advanced radiological/nuclear emergency preparedness response domestically and internationally by conducting 65 virtual or in-person training events on topics including crisis communication, nuclear incident response, medical response, and security of major public events.
- Further increased confidence in new energetic disablement tools and improved accuracy in predictive modeling capabilities in support of the C-WMD mission.
- Delivered two specialized readiness assessments to the national nuclear incident response teams.
- Executed focused science experiments in support of nuclear materials characterization assessments.
- Supported the DOE Office of Security rollout of DOE Order 470.3C Chg. 1 and provided technical feedback informing DOE Complex operations and handling of nuclear materials.
- NEST conducted equipment recapitalization, innovation, and delivery of equipment to first responders while participating in an interagency process to identify response gaps and potential remediation options.
- Improved and integrated NEST Public Health and Safety programs to ensure an agile and interoperable capability that is mutually supportive across all mission areas, including mission partner engagement, anomaly detection, analysis, and assessment.
- In cooperation with the DOE/NNSA Office of DNN Research and Development program, supported the development of new tools that support WMD device defeat, nuclear search, detection, and remediation.

- Conducted strategic messaging efforts to educate interagency partners, congressional audiences, and members of the general public about the CTCP mission, as well as influence adversary perceptions of the U.S. Government counterterrorism and counterproliferation capabilities.
- NEST conducted 14 unscheduled operations, including NEST support to Ukraine, and 46 scheduled operations, including Preventive Radiological/Nuclear Detection support to the State of the Union address in 2022, New Year's Eve celebrations in Las Vegas and New York City, Super Bowl LVI, the 2022 Independence Day celebration on the National Mall, and the 77th Session of the United Nations General Assembly.
- NEST honed operational readiness through participation in 39 exercises and joint drills, as well as numerous small-footprint and virtual training venues.
- NEST tested and field new tools for FBI regional teams as part of the NNSA-FBI "Capability Forward" initiative to accelerate life-saving responses to nuclear and radiological threats.
- Conducted AMS Phase II recapitalization procurement efforts to replace two aging two rotary-wing aircraft, with delivery of new aircraft expected in the first quarter of FY 2024.
- Completed installation of pre-detonation nuclear forensic analysis capacity to support the NNMA and completed planned analyses of NNMA specimens.
- Effectively maintained cooperative relationships with international partners for nuclear forensics technical exchanges by utilizing a suite of virtual capabilities.
- Improved nuclear forensics infrastructure, equipment, technology, and capabilities through increased investments.

Counterterrorism and Counterproliferation

Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Counterterrorism and Counterproliferation $440,074,000	**Counterterrorism and Counterproliferation $474,420,000**	**Counterterrorism and Counterproliferation +$34,346,000**
Nuclear Incident Response/Nuclear Emergency Support Team $236,472	***Nuclear Incident Response/Nuclear Emergency Support Team $259,088***	***Nuclear Incident Response/Nuclear Emergency Support Team +$22,616***
• Rapidly respond to locate and identify radiological/nuclear devices and prevent these devices from detonating. • Rapidly respond to evaluate and recover any damaged U.S. nuclear weapons. • Detect nuclear or radiological materials during high-profile events or in response to a threat. Lead the Federal Government's monitoring and technical assessment efforts after a nuclear or radiological incident or accident. • Procurement of mission critical equipment to recapitalize equipment that has exceeded its useful life. Priorities include handheld and vehicle-borne radiation detection equipment, high resolution spectroscopic identification systems, correlated neutron detectors, high-energy radiography equipment, and contamination survey meters. Sustain enhancements of render safe capabilities to current Stabilization cities in conjunction with the FBI. • Begin the development of a NEST training program, focused on organizing and standardizing training content for interagency partners, particularly FBI regional render safe teams and field offices.	• Rapidly respond to locate and identify radiological/nuclear devices and prevent these devices from detonating. • Rapidly respond to evaluate and recover any damaged U.S. nuclear weapons. • Detect nuclear or radiological materials during high-profile events or in response to a threat. Lead the Federal Government's monitoring and technical assessment efforts after a nuclear or radiological incident or accident. • Procure mission critical equipment to recapitalize equipment that has exceeded its useful life. Priorities include handheld and vehicle-borne radiation detection equipment, high resolution spectroscopic identification systems, correlated neutron detectors, high-energy radiography equipment, and contamination survey meters. • Sustain enhancements of WMD device defeat capabilities to the Level V cities in conjunction with the FBI. • Establish a core NEST training program, focused on organizing and standardizing training content for interagency partners, particularly FBI regional render safe teams and field offices. • Deliver training and maintain equipment to sustain and enhance the ability of specialized	• Provides increased NEST capacity to respond to various types of emergencies with particular focus on lessons-learned from the Ukraine crisis and related activities. If Ukraine remains a high-pace contingency operation, priorities will be adjusted to meet those demands. • Establishes a standardized NEST training program to provide interagency partners with technical training required to enable further expansion of regional capabilities to secure and defeat WMD.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
• Deliver training and maintain equipment to sustain and enhance the ability of specialized regional teams (Stabilization teams) to respond to a nuclear terrorism threat. • Develop science and technologies that are most promising to improve the quality or speed of nuclear terrorism threat response.	regional teams (Stabilization teams) to respond to a nuclear terrorism threat. • Develop science and technologies that are most promising to improve the quality or speed of nuclear terrorism threat response.	
National Technical Nuclear Forensics $50,555	***National Technical Nuclear Forensics $61,363***	***National Technical Nuclear Forensics +$10,808***
• Provide technical and operational capabilities in support of the U.S. Government interagency NTNF program. • Lead the technical components performed at the U.S. national laboratories for the interagency nuclear forensics mission. • Examine advancing analytic techniques for interdicted materials, ground samples, air samples, and prompt signals. • Maintain readiness to respond to pre- and post-detonation nuclear events. • Participate in one Ground Collection Task Force field exercise and one enhanced training event. • Participate in two Post-Detonation device assessment training and drill events. • Conduct two DFEAT exercises. • Sustain preventative and corrective facility maintenance at P-Tunnel, Nevada National Security Site (NNSS) for support to the Pre-Detonation Device Program. Address broader infrastructure improvements at the NNSS. • Expand operational capacity for Bulk Special Nuclear Materials Analysis Program (BSAP)	• Provide technical and operational capabilities in support of the U.S. Government interagency NTNF program. • Lead the technical components performed at the U.S. national laboratories for the interagency nuclear forensics mission. • Examine advancing analytic techniques for interdicted materials, ground samples, air samples, and prompt signals. • Maintain readiness to respond to pre- and post-detonation nuclear events. • Participate in one Ground Collection Task Force field exercise and one enhanced training event. • Participate in two Post-Detonation device assessment training and drill events. • Conduct two DFEAT exercises. • Sustain preventative and corrective facility maintenance at P-Tunnel, NNSS for support to the Pre-Detonation Device Program. Address broader infrastructure improvements at the NNSS. • Expand operational capacity for Bulk Special Nuclear Materials Analysis Program (BSAP) laboratories at LANL and LLNL.	• Enables NTNF to make progress towards meeting the DOE/NNSA components of new U.S. Government forensics and attribution requirements. It will also bridge a gap between research and development (R&D) activities geared toward technology transition and the operational capabilities in NTNF. • Improves key NTNF mission areas, some of which are informed by USG demand during the Ukraine Crisis and includes: ○ Upgrading Device Assessment capabilities. ○ Re-establishing modeling, measurements, and diagnostics. ○ Enhancing in-field air and ground samples analysis to increase timeliness and confidence in initial assessments early in an incident, conflict, or emergency. ○ Augmenting mid, and high Technical Readiness Level (TRL) R&D. • Contributes to NNSA Enterprise infrastructure upgrades essential to NTNF operations and capabilities.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
laboratories at Los Alamos National Laboratory and Lawrence Livermore National Laboratory. • Identify, prioritize, analyze, and characterize historical nuclear material samples of value to the technical nuclear forensics program through administration of the NNMA. • Lead U.S. nuclear forensics technical collaboration efforts with the United Kingdom under the Nuclear Threat Reduction channel.	• Identify, prioritize, analyze, and characterize historical nuclear material samples of value to the technical nuclear forensics program through administration of the NNMA. • Lead U.S. nuclear forensics technical collaboration efforts with the United Kingdom under the Nuclear Threat Reduction channel.	
Nuclear Incident Policy and Cooperation $12,067	***Nuclear Incident Policy and Cooperation $13,309***	***Nuclear Incident Policy and Cooperation +$1,242***
• Conduct 18 advanced partnership engagements, specialized technical exchanges, and workshops. • Conduct seven *Silent Thunder* domestic WMD counterterrorism tabletop exercises (TTXs). • Develop a combined virtual training and in-person instruction program for increased reach and impact for both domestic and international training. • Address additional demand for Policy & Partnership events and sustain strategic outreach, leveraging hybrid training formats to reach a broader audience. • Conduct 13 international nuclear and radiological training courses, operational support, and provide technical support. • Conduct 15 multilateral and bilateral scenario-based policy discussions, CT domestic and international TTXs. • Develop new Counterterrorism Response & Capacity Building Respond initiatives in concert with DNN *Prevent-Counter* mission and support activities.	• Conduct 20 advanced partnership engagements, specialized technical exchanges, and workshops. • Conduct seven *Silent Thunder* domestic WMD counterterrorism TTXs. • Develop a combined virtual training and in-person instruction program for increased reach and impact for both domestic and international training. • Address additional demand for Policy & Partnership events and sustain strategic outreach, leveraging hybrid training formats to reach a broader audience. • Conduct 17 international nuclear and radiological training courses, operational support, and provide technical support. • Conduct 16 multilateral and bilateral scenario-based policy discussions, CT domestic and international TTXs. • Develop new Counterterrorism Response & Capacity Building Respond initiatives in concert with DNN *Prevent-Counter* mission and support activities.	• Provides additional capacity for U.S. national laboratory emergency response expertise to be made available for international capacity building activities. • Will develop and execute new tailored training courses and exercises drawn from lessons learned and requests from the Ukraine Crisis.

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted ($)
Nuclear Threat Science $140,980	***Nuclear Threat Science $140,660***	***Nuclear Threat Science -$320***
• Maintain capability to perform assessments of nuclear threat devices. • Maintain the integrity of sensitive nuclear threat related information protected under the Sigma 20 program, while protecting the information from unauthorized disclosure. • Manage classified bilateral nuclear counterterrorism technical exchanges with the United Kingdom and France and provide leadership to the trilateral P3 Nuclear Threat Reduction framework. • Execute integrated experiments to validate nuclear threat assessments. • Develop predictive modeling tools and nuclear threat device training for the WMD defeat community and other operational partners. • Conduct foundational science to support technical assessments of nuclear materials, explosives, and nuclear threat device designs in support of operational partners and the intelligence and security communities. Conduct research of technologies in support of U.S. Government CTCP strategic priorities.	• Maintain capability to perform assessments of nuclear threat devices. • Maintain the integrity of sensitive nuclear threat related information protected under the Sigma 20 program, while protecting the information from unauthorized disclosure. • Manage classified bilateral nuclear counterterrorism technical exchanges with the United Kingdom and France and provide leadership to the trilateral P3 Nuclear Threat Reduction framework. • Execute integrated experiments to validate nuclear threat assessments. • Develop predictive modeling tools and nuclear threat device training for the WMD defeat community and other operational partners. • Conduct foundational science to support technical assessments of nuclear materials, explosives, and nuclear threat device designs in support of operational partners and the intelligence and security communities. • Conduct research of technologies in support of U.S. Government CTCP strategic priorities.	• No major changes.

DNN Nuclear Counterterrorism and Incident Response Program
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	2,718	2,916	3,118	+202
High Performance Computing (HPC) Upgrade, LANL[a]	14,000	0	0	14,000	0	-14,000
High Performance Computing (HPC) Upgrade, LLNL[a]	10,000	0	0	10,000	0	-10,000
High Performance Computing (HPC) Upgrade, SNL[a]	10,700	0	0	10,700	0	-10,700
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**2,718**	**37,616**	**3,118**	**-34,498**

Outyears for Capital Equipment Summary

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	3,262	3,331	3,401	3,472	N/A
Total, Capital Equipment (including MIE)	**3,262**	**3,331**	**3,401**	**3,472**	**N/A**

[a] Division M of P.L. 117-328 (Additional Ukraine Supplemental Appropriations Act, 2023) funding is in support of the Ukraine Crisis response activities directed to be obligated in FY 2023 and are only included for the sole purpose of the MIE notification.

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Argonne National Laboratory			
Conversion	21,913	25,253	22,034
Nuclear Material Removal	550	0	75
Material Disposition	60	150	150
Material Management and Minimization	22,523	25,403	22,259
International Nuclear Security	55	5,713	5,514
Radiological Security	2,943	2,292	2,275
Nuclear Smuggling Detection and Deterrence	1,258	1,000	642
Global Material Security	4,256	9,005	8,431
Nonproliferation & Arms Control	11,168	15,041	13,846
Proliferation Detection R&D	3,270	3,500	3,500
Nonproliferation Fuels Development	771	4,000	0
Forensics R&D	575	575	1,000
Nonproliferation Stewardship Program	0	300	805
Defense Nuclear Nonproliferation R&D	4,616	8,375	5,305
Emergency Operations	30	704	200
Counterterrorism and Counterproliferation	3,033	2,887	3,336
Nuclear Counterterrorism & Incident Response	3,063	3,591	3,536
Total Argonne National Laboratory	**45,626**	**61,415**	**53,377**
Brookhaven National Laboratory			
Conversion	225	400	245
Material Management and Minimization	225	400	245
International Nuclear Security	121	0	0
Radiological Security	714	387	648
Nuclear Smuggling Detection and Deterrence	666	1,000	315
Global Material Security	1,501	1,387	963
Nonproliferation & Arms Control	3,527	3,357	3,100
Proliferation Detection R&D	10,063	6,700	6,652
Forensics R&D	475	475	644
Nonproliferation Stewardship Program	0	300	0
Defense Nuclear Nonproliferation R&D	10,538	7,475	7,296
Counterterrorism and Counterproliferation	3,059	2,900	3,483
Nuclear Counterterrorism & Incident Response	3,059	2,900	3,483
Total Brookhaven National Laboratory	**18,850**	**15,519**	**15,087**
Consolidated Business Center			
Material Disposition	0	60	0
Material Management and Minimization	0	60	0
Total Consolidated Business Center	**0**	**60**	**0**
Fermi National Accelerator Laboratory			
Radiological Security	10	0	0
Global Material Security	10	0	0
Proliferation Detection R&D	750	843	864
Defense Nuclear Nonproliferation R&D	750	843	864
Total Fermi National Accelerator Laboratory	**760**	**843**	**864**
Idaho National Laboratory			
Conversion	43,586	44,530	41,791
Nuclear Material Removal	9,250	6,080	6,325
Material Management and Minimization	52,836	50,610	48,116

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
International Nuclear Security	995	7,216	6,937
Radiological Security	16,287	19,040	18,896
Nuclear Smuggling Detection and Deterrence	835	1,000	66
Global Material Security	18,117	27,256	25,899
Nonproliferation & Arms Control	2,930	3,010	2,761
Proliferation Detection R&D	6,560	7,250	37,939
Nonproliferation Fuels Development	1,508	10,000	0
Forensics R&D	900	900	1,070
Nonproliferation Stewardship Program	5,075	3,245	886
Defense Nuclear Nonproliferation R&D	14,043	21,395	39,895
Counterterrorism and Counterproliferation	5,948	5,996	6,016
Nuclear Counterterrorism & Incident Response	5,948	5,996	6,016
Total Idaho National Laboratory	**93,874**	**108,267**	**122,687**
Kansas City National Security Complex (KCNSC)			
Material Disposition	4,756	6,325	16,350
Material Management and Minimization	4,756	6,325	16,350
Proliferation Detection R&D	1,825	1,250	1,210
Defense Nuclear Nonproliferation R&D	1,825	1,250	1,210
Counterterrorism and Counterproliferation	35,220	31,257	36,598
Nuclear Counterterrorism & Incident Response	35,220	31,257	36,598
Total Kansas City National Security Complex (KCNSC)	**41,801**	**38,832**	**54,158**
Kansas City Site Office			
Nonproliferation & Arms Control	2,119	2,790	2,570
Nonproliferation Stewardship Program	700	950	0
Defense Nuclear Nonproliferation R&D	700	950	0
Total Kansas City Site Office	**2,819**	**3,740**	**2,570**
Lawrence Berkeley National Laboratory			
Nonproliferation & Arms Control	1,069	1,630	1,508
Proliferation Detection R&D	14,209	9,407	9,285
Forensics R&D	120	120	57
Nonproliferation Stewardship Program	1,090	1,700	0
Defense Nuclear Nonproliferation R&D	15,419	11,227	9,342
Emergency Operations	450	450	450
Counterterrorism and Counterproliferation	0	90	103
Nuclear Counterterrorism & Incident Response	450	540	553
Total Lawrence Berkeley National Laboratory	**16,938**	**13,397**	**11,403**
Lawrence Livermore National Laboratory			
Nuclear Material Removal	200	0	0
Material Disposition	200	0	100
Material Management and Minimization	400	0	100
International Nuclear Security	6,253	7,995	7,794
Radiological Security	6,508	7,551	7,534
Nuclear Smuggling Detection and Deterrence	2,531	4,450	4,266
Global Material Security	15,292	19,996	19,594
Nonproliferation & Arms Control	25,360	38,011	34,996
Proliferation Detection R&D	31,485	34,895	33,002
Nuclear Detonation Detection	17,470	21,277	23,743
Forensics R&D	10,119	9,819	13,291
Nonproliferation Stewardship Program	17,000	15,875	14,801

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Defense Nuclear Nonproliferation R&D	76,074	81,866	84,837
NNSA Bioassurance Program	0	5,000	6,250
Counterterrorism and Counterproliferation	74,911	85,536	91,068
Nuclear Counterterrorism & Incident Response	74,911	85,536	91,068
Total Lawrence Livermore National Laboratory	**192,037**	**230,409**	**236,845**
Los Alamos National Laboratory			
Conversion	1,781	1,365	701
Nuclear Material Removal	936	200	200
Material Disposition	58,202	61,375	113,096
Material Management and Minimization	60,919	62,940	113,997
International Nuclear Security	2,456	3,324	3,183
Radiological Security	25,356	27,644	27,435
Nuclear Smuggling Detection and Deterrence	9,074	12,450	12,152
Global Material Security	36,886	43,418	42,770
Nonproliferation & Arms Control	57,321	52,278	48,140
Proliferation Detection R&D	41,070	41,124	40,138
Nuclear Detonation Detection	95,121	97,943	95,059
Forensics R&D	10,496	10,046	12,061
Nonproliferation Stewardship Program	1,770	3,250	3,605
Defense Nuclear Nonproliferation R&D	148,457	152,363	150,863
NNSA Bioassurance Program	0	5,000	6,250
Counterterrorism and Counterproliferation	71,587	83,525	88,977
Nuclear Counterterrorism & Incident Response	71,587	83,525	88,977
Total Los Alamos National Laboratory	**375,170**	**399,524**	**450,997**
National Energy Technology Lab			
Material Disposition	750	750	1,245
Material Management and Minimization	750	750	1,245
International Nuclear Security	500	300	290
Global Material Security	500	300	290
Nonproliferation & Arms Control	170	0	0
Total National Energy Technology Lab	**1,420**	**1,050**	**1,535**
Nevada Field Office			
Counterterrorism and Counterproliferation	0	0	75
Nuclear Counterterrorism & Incident Response	0	0	75
Total Nevada Field Office	**0**	**0**	**75**
Nevada National Security Site			
Nuclear Material Removal	1,706	300	0
Material Management and Minimization	1,706	300	0
Radiological Security	157	0	0
Global Material Security	157	0	0
Nonproliferation & Arms Control	355	1,273	1,168
Proliferation Detection R&D	16,636	17,047	17,274
Nuclear Detonation Detection	48,071	32,093	21,025
Forensics R&D	250	250	137
Nonproliferation Stewardship Program	16,044	20,000	15,968
Defense Nuclear Nonproliferation R&D	81,001	69,390	54,404
Emergency Operations	50	11	62
Counterterrorism and Counterproliferation	43,953	43,352	49,872
Nuclear Counterterrorism & Incident Response	44,003	43,363	49,934

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Total Nevada National Security Site	**127,222**	**114,326**	**105,506**
NNSA Albuquerque Complex			
Conversion	735	0	1,124
Nuclear Material Removal	2,400	0	700
Material Management and Minimization	3,135	0	1,824
International Nuclear Security	6,134	2,817	2,719
Radiological Security	32,015	33,409	33,156
Nuclear Smuggling Detection and Deterrence	71,376	67,681	75,451
Global Material Security	109,525	103,907	111,326
Proliferation Detection R&D	15,720	19,675	20,172
Nuclear Detonation Detection	12,095	11,355	6,373
Forensics R&D	5,000	5,000	566
Nonproliferation Stewardship Program	11,750	13,073	16,780
Defense Nuclear Nonproliferation R&D	44,565	49,103	43,891
Counterterrorism and Counterproliferation	10	6,173	6,556
Nuclear Counterterrorism & Incident Response	10	6,173	6,556
Legacy Contractor Pensions and Settlement Payments - DNN	38,800	55,708	22,587
Total NNSA Albuquerque Complex	**196,035**	**214,891**	**186,184**
NNSA Production Office (NPO)			
Conversion	0	0	15,000
Material Disposition	9,220	15,090	22,090
Material Management and Minimization	9,220	15,090	37,090
Total NNSA Production Office (NPO)	**9,220**	**15,090**	**37,090**
Oak Ridge Institute for Science & Education			
International Nuclear Security	0	40	39
Global Material Security	0	40	39
Nonproliferation & Arms Control	0	168	149
Counterterrorism and Counterproliferation	3,067	3,693	3,605
Nuclear Counterterrorism & Incident Response	3,067	3,693	3,605
Total Oak Ridge Institute for Science & Education	**3,067**	**3,901**	**3,793**
Oak Ridge National Laboratory			
Conversion	3,932	3,642	1,587
Nuclear Material Removal	8,613	4,550	4,975
Material Disposition	3,538	8,800	6,600
Material Management and Minimization	16,083	16,992	13,162
International Nuclear Security	13,286	15,448	14,511
Radiological Security	20,511	20,254	21,951
Nuclear Smuggling Detection and Deterrence	12,907	20,630	17,170
Global Material Security	46,704	56,332	53,632
Nonproliferation & Arms Control	20,355	31,579	29,072
Proliferation Detection R&D	37,070	36,965	36,496
Nuclear Detonation Detection	180	0	452
Nonproliferation Fuels Development	1,227	6,000	0
Forensics R&D	3,725	3,650	4,194
Nonproliferation Stewardship Program	18,750	37,827	22,408
Defense Nuclear Nonproliferation R&D	60,952	84,442	63,550
NNSA Bioassurance Program	0	2,500	1,250
Counterterrorism and Counterproliferation	10,613	7,740	8,800
Nuclear Counterterrorism & Incident Response	10,613	7,740	8,800

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Total Oak Ridge National Laboratory	**154,707**	**199,585**	**169,466**
Office of Scientific & Technical Information			
Nuclear Detonation Detection	14	80	73
Defense Nuclear Nonproliferation R&D	14	80	73
Total Office of Scientific & Technical Information	**14**	**80**	**73**
Pacific Northwest National Laboratory			
Conversion	16,815	16,679	12,628
Nuclear Material Removal	575	0	200
Material Disposition	4,575	3,200	2,984
Material Management and Minimization	21,965	19,879	15,812
International Nuclear Security	26,519	15,067	14,710
Radiological Security	89,653	72,198	75,186
Nuclear Smuggling Detection and Deterrence	82,569	52,242	50,653
Global Material Security	198,741	139,507	140,549
Nonproliferation & Arms Control	21,093	36,470	33,574
Proliferation Detection R&D	27,083	27,074	27,246
Nuclear Detonation Detection	16,355	18,171	20,009
Forensics R&D	5,791	5,594	5,419
Nonproliferation Stewardship Program	20,425	8,901	3,603
Defense Nuclear Nonproliferation R&D	69,654	59,740	56,277
NNSA Bioassurance Program	0	2,500	3,750
18-D-150, Surplus Plutonium Disposition Project, SRS	2,700	0	0
Nonproliferation Construction	2,700	0	0
Emergency Operations	1,326	1,326	1,831
Counterterrorism and Counterproliferation	6,789	5,939	5,541
Nuclear Counterterrorism & Incident Response	8,115	7,265	7,372
Total Pacific Northwest National Laboratory	**322,268**	**265,361**	**257,334**
Pantex Plant			
Material Disposition	5,800	6,000	5,433
Material Management and Minimization	5,800	6,000	5,433
Nonproliferation & Arms Control	881	4,774	4,396
Counterterrorism and Counterproliferation	3,706	4,025	3,237
Nuclear Counterterrorism & Incident Response	3,706	4,025	3,237
Total Pantex Plant	**10,387**	**14,799**	**13,066**
Princeton Plasma Physics Laboratory			
Proliferation Detection R&D	460	855	876
Defense Nuclear Nonproliferation R&D	460	855	876
Total Princeton Plasma Physics Laboratory	**460**	**855**	**876**
Richland Operations Office			
Counterterrorism and Counterproliferation	2,251	1,701	3,020
Nuclear Counterterrorism & Incident Response	2,251	1,701	3,020
Total Richland Operations Office	**2,251**	**1,701**	**3,020**
Sandia National Laboratories			
Conversion	550	775	573
Nuclear Material Removal	100	0	0
Material Disposition	1,628	500	452

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Material Management and Minimization	2,278	1,275	1,025
International Nuclear Security	20,114	18,657	18,790
Global Material Security	20,114	18,657	18,790
Nonproliferation & Arms Control	10,748	13,421	12,359
Proliferation Detection R&D	31,535	35,947	32,807
Nuclear Detonation Detection	102,224	94,272	111,213
Forensics R&D	2,000	1,650	1,865
Nonproliferation Stewardship Program	1,200	450	886
Defense Nuclear Nonproliferation R&D	136,959	132,319	146,771
NNSA Bioassurance Program	0	5,000	5,000
Counterterrorism and Counterproliferation	61,083	74,115	81,236
Nuclear Counterterrorism & Incident Response	61,083	74,115	81,236
Total Sandia National Laboratories	**231,182**	**244,787**	**265,181**
Sandia Site Office			
Radiological Security	44,653	49,355	49,523
Nuclear Smuggling Detection and Deterrence	16,138	10,500	12,084
Global Material Security	60,791	59,855	61,607
Total Sandia Site Office	**60,791**	**59,855**	**61,607**
Savannah River Operations Office			
Nuclear Material Removal	150	0	750
Material Disposition	5,370	4,424	8,932
Material Management and Minimization	5,520	4,424	9,682
International Nuclear Security	4	0	0
Global Material Security	4	0	0
Nonproliferation & Arms Control	7,504	7,427	6,838
18-D-150, Surplus Plutonium Disposition Project, SRS	13	102	0
Nonproliferation Construction	13	102	0
Counterterrorism and Counterproliferation	0	0	268
Nuclear Counterterrorism & Incident Response	0	0	268
Total Savannah River Operations Office	**13,041**	**11,953**	**16,788**
Savannah River Site			
Conversion	2,764	6,825	6,173
Nuclear Material Removal	13,400	27,536	13,025
Material Disposition	77,960	40,298	47,235
Material Management and Minimization	94,124	74,659	66,433
Nuclear Smuggling Detection and Deterrence	0	1,000	251
Global Material Security	0	1,000	251
Proliferation Detection R&D	16,006	16,200	12,918
Forensics R&D	1,725	1,660	1,972
Nonproliferation Stewardship Program	3,900	10,937	1,021
Defense Nuclear Nonproliferation R&D	21,631	28,797	15,911
18-D-150, Surplus Plutonium Disposition Project, SRS	152,177	66,764	69,211
Nonproliferation Construction	152,177	66,764	69,211
Counterterrorism and Counterproliferation	3,745	2,726	2,852
Nuclear Counterterrorism & Incident Response	3,745	2,726	2,852
Total Savannah River Site	**271,677**	**173,946**	**154,658**
SLAC National Accelerator Laboratory			
Proliferation Detection R&D	1,400	1,133	1,161
Forensics R&D	275	275	832

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Defense Nuclear Nonproliferation R&D	1,675	1,408	1,993
Total SLAC National Accelerator Laboratory	**1,675**	**1,408**	**1,993**
Washington Headquarters			
Conversion	5,649	48,671	2,000
Nuclear Material Removal	920	1,000	1,000
Material Disposition	6,839	81,413	19,375
Material Management and Minimization	13,408	131,084	22,375
International Nuclear Security	464	8,257	7,322
Radiological Security	1,429	13,395	7,064
Nuclear Smuggling Detection and Deterrence	755	11,047	6,653
Global Material Security	2,648	32,699	21,039
Nonproliferation & Arms Control	13,668	12,381	11,404
Proliferation Detection R&D	11,715	37,818	7,366
Nuclear Detonation Detection	2,970	4,015	7,656
Nonproliferation Fuels Development	16,494	0	0
Forensics R&D	2,403	3,700	565
Nonproliferation Stewardship Program	450	1,271	19,627
Defense Nuclear Nonproliferation R&D	34,032	46,804	35,214
NNSA Bioassurance Program	0	0	2,500
18-D-150, Surplus Plutonium Disposition Project, SRS	1,110	4,898	8,000
Nonproliferation Construction	1,110	4,898	8,000
Emergency Operations	12,741	27,405	16,580
Counterterrorism and Counterproliferation	24,842	76,112	75,830
Nuclear Counterterrorism & Incident Response	37,583	103,517	92,410
Total Washington Headquarters	**102,449**	**331,383**	**192,942**
Waste Isolation Pilot Plant			
Material Disposition	10,208	8,780	14,710
Material Management and Minimization	10,208	8,780	14,710
Nonproliferation & Arms Control	295	350	319
Counterterrorism and Counterproliferation	55	30	35
Nuclear Counterterrorism & Incident Response	55	30	35
Total Waste Isolation Pilot Plant	**10,558**	**9,160**	**15,064**
Y-12 National Security Complex			
Conversion	2,710	5,120	12,819
Nuclear Material Removal	3,300	15,334	19,850
Material Disposition	11,080	18,860	23,498
Material Management and Minimization	17,090	39,314	56,167
International Nuclear Security	3,038	2,929	2,898
Radiological Security	12,766	14,475	14,365
Nuclear Smuggling Detection and Deterrence	391	2,000	1,605
Global Material Security	16,195	19,404	18,868
Nonproliferation & Arms Control	6,232	6,696	6,158
Proliferation Detection R&D	2,550	1,600	1,482
Forensics R&D	1,146	700	1,086
Nonproliferation Stewardship Program	2,175	6,921	7,047
Defense Nuclear Nonproliferation R&D	5,871	9,221	9,615
Counterterrorism and Counterproliferation	2,313	2,277	3,912
Nuclear Counterterrorism & Incident Response	2,313	2,277	3,912
Total Y-12 National Security Complex	**47,701**	**76,912**	**94,720**

DEPARTMENT OF ENERGY
Funding by Site
Defense Nuclear Nonproliferation - FY 2024
(Dollars in Thousands)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request
Total Funding by Site - Defense Nuclear Nonproliferation	**2,354,000**	**2,613,048**	**2,528,959**

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Naval Reactors

Naval Reactors

Naval Reactors
Proposed Appropriation Language

For Department of Energy expenses necessary for Naval Reactors' activities to carry out the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition (by purchase, condemnation, construction, or otherwise) of real property, plant, and capital equipment, facilities, and facility expansion, [$2,081,445,000] $1,964,100,000 to remain available until expended [of which, $99,747,000 shall be transferred to "Department of Energy—Energy Programs—Nuclear Energy", for the Advanced Test Reactor (ATR)]: *Provided*, that [$58,525,000] $61,540,000 shall be available until September 30, [2024] 2025 for program direction.

Explanation of Changes

Changes from the FY 2023 Proposed Appropriation Language consist of changes to the requested funding amount and the period of availability of program direction funding. The FY 2024 Budget Request reflects a 5.6% decrease from FY 2023 enacted levels (not including the ATR transfer). The decrease reflects the October 2022 revision of the performance baseline for the Spent Fuel Handling Recapitalization Project (SFHP) while maintaining support for the current fleet, continuing advanced technology development investment in support of today's fleet and future capabilities, and supporting infrastructure modernization and reduction of legacy environmental liabilities.

Public Law Authorizations

- P.L. 83-703, "Atomic Energy Act of 1954"
- Executive Order 12344 (42 U.S.C. 7158), "Naval Nuclear Propulsion Program"
- P.L. 106-65, National Nuclear Security Administration Act, as amended
- P.L. 117-397, National Defense Authorization Act for Fiscal Year 2023
- P.L. 117-328, Consolidated Appropriations Act, 2023

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Naval Reactors[a]

	($K)				
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request s FY 2023 Request ($)	FY 2024 Request s FY 2023 Request (%)
Naval Reactors	**1,918,000**	**2,081,445**	**1,964,100**	**-117,345**	**-5.6%**

Overview
The Naval Reactors (NR) appropriation is responsible for U.S. Navy nuclear propulsion work, beginning with reactor plant technology development and design, continuing through reactor plant operation and maintenance, and ending with final disposition of naval spent nuclear fuel. The program ensures the safe and reliable operation of reactor plants in nuclear-powered submarines and aircraft carriers (constituting over 40% of the Navy's major combatants)[b] and fulfills the Navy's requirements for new nuclear propulsion plants that meet current and future national defense requirements.

Naval Reactors mission includes ensuring the safety of reactors and associated naval nuclear propulsion plants, and control of radiation and radioactivity associated with naval nuclear propulsion activities, including prescribing and enforcing standards and regulations for these areas, as they affect the environment, safety and health of workers, operators, and the general public. Naval Reactors maintains oversight in areas such as security, nuclear safeguards and transportation, radiological controls, public information, procurement, logistics, and fiscal management.

As part of the National Nuclear Security Administration (NNSA), Naval Reactors is working to provide the U.S. Navy with nuclear propulsion plants that are capable of responding to the challenges of the 21st-century security environment.

Highlights and Major Changes in the FY 2024 Budget Request
Naval Reactors request of $1,964,100,000 in FY 2024 is for continued achievement of its core objective of ensuring the safe and reliable operation of the Nation's nuclear fleet.

Naval Reactors request supports continued reinvestment in advanced technology development, modernization of infrastructure, and remediation of environmental liabilities.

Naval Reactors request includes additional funding, compared to the plan in the FY 2023 Future-Years Nuclear Security Program, for the Spent Fuel Handling Recapitalization Project (SFHP) and to support Navy timelines for future attack submarine development.

Major Outyear Priorities and Assumptions
The outyear funding (FY 2025 through FY 2028) for Naval Reactors is $8,501,226,000. Outyear funding supports Naval Reactors core mission of providing proper maintenance and safety oversight, and addressing emergent operational issues and technology obsolescence for 99 operating reactor plants. This includes 68 submarines, 11 aircraft carriers, and 5 research, development, and training platforms (including the land-based prototypes). Outyear funding also supports Naval Reactors continued achievement of ongoing new plant design projects, as well as continued achievement of its legacy responsibilities, such as ensuring proper management of naval spent nuclear fuel, prudent recapitalization of aging facilities, and cleanup of environmental liabilities.

Department of Energy (DOE) Working Capital Fund (WCF) Support[c]
The Naval Reactors appropriation projected contribution to the DOE WCF for FY 2024 is $2,509,000. This funding covers certain shared enterprise activities including managing enterprise-wide systems and data, telecommunications, and supporting the integrated acquisition environment.

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[a] Throughout this document, funding does not reflect the mandated transfer of $92.75 million in FY 2022 and $99.75 million in FY 2023 to the Office of Nuclear Energy for operation of the Advanced Test Reactor.
[b] Major combatants, in this instance, include aircraft carriers, submarines, and surface combatants based on the "Active in Commission" column from the Naval Vessel Register.
[c] There are differences between NNSA's budget for WCF and the amounts allocated to NNSA in the WCF budget included in Volume 2. These differences will be addressed during execution of the FY 2024 budget.

Rickover Fellowship Program

Naval Reactors manages the fellowship to attract and develop technical leaders in the areas of reactor technology and design as it pertains to naval nuclear propulsion. NR anticipates spending $1,417,632 in FY 2024 to support this program.

Naval Reactors

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Naval Reactors					
Naval Reactors Operations and Infrastructure	594,017	668,802	712,036	+43,234	6.5%
Naval Reactors Development	640,684	746,000	838,340	+92,340	12.4%
S8G Prototype Refueling	126,000	20,000	0	-20,000	-100.0%
Columbia-Class Reactor Systems Development	55,000	53,900	52,900	-1,000	-1.9%
Program Direction	55,579	58,525	61,540	+3,015	5.2%
Construction	446,720	534,218	299,284	-234,934	-44.0%
Total, Naval Reactors	**1,918,000**	**2,081,445**	**1,964,100**	**-117,345**	**-5.6%**

Outyears for Naval Reactors Funding ($K)

($K)

	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Naval Reactors				
Naval Reactors Operations and Infrastructure	786,788	788,613	774,364	779,687
Naval Reactors Development	890,682	908,243	961,048	1,013,727
S8G Prototype Refueling	0	0	0	0
Columbia-Class Reactor Systems Development	45,610	35,300	29,700	0
Program Direction	65,848	71,115	72,893	74,716
Construction	398,672	328,970	238,080	237,170
Total, Naval Reactors	**2,187,600**	**2,132,241**	**2,076,085**	**2,105,300**

Naval Reactors Funding

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Naval Reactors					
Naval Reactors Operations and Infrastructure					
Research Reactor Facility Operations & Maintenance	152,110	105,800	101,000	-4,800	-4.5%
MARF Defueling and Layup	15,493	53,100	79,100	+26,000	49.0%
Laboratory Facility Regulation, Compliance, & Protection	140,405	158,415	167,500	+9,085	5.7%
Nuclear Spent Fuel Management	139,646	137,051	164,970	+27,919	20.4%
Radiological/Environmental Remediation & Demolition	92,463	122,821	133,686	+10,865	8.8%
Technical Infrastructure Operations Support	17,200	18,250	19,500	+1,250	6.8%
Capital Equipment	100	18,800	4,100	-14,700	-78.2%
Minor Construction	36,600	54,565	42,180	-12,385	-22.7%
Total, Naval Reactors Operations and Infrastructure	**594,017**	**668,802**	**712,036**	**+43,234**	**6.5%**
Naval Reactors Development					
Ship Construction & Maintenance Support	39,000	35,600	36,000	+400	1.1%
Nuclear Reactor Technology	207,800	257,300	308,710	+51,410	20.0%
Reactor Systems & Component Technology	294,237	330,348	392,030	+61,682	18.7%
Advanced Test Reactor Operations	92,747	99,747	92,800	-6,947	-7.0%
Capital Equipment	6,900	23,005	8,800	-14,205	-61.7%
Total, Naval Reactors Development	**640,684**	**746,000**	**838,340**	**+92,340**	**12.4%**
S8G Prototype Refueling	**126,000**	**20,000**	**0**	**-20,000**	**-100.0%**
Columbia-Class Reactor Systems Development	**55,000**	**53,900**	**52,900**	**-1,000**	**-1.9%**
Program Direction	**55,579**	**58,525**	**61,540**	**+3,015**	**5.2%**
Construction	**446,720**	**534,218**	**299,284**	**-234,934**	**-44.0%**
Total, Naval Reactors	**1,918,000**	**2,081,445**	**1,964,100**	**-117,345**	**-5.6%**

Outyears for Naval Reactors Funding

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Naval Reactors				
Naval Reactors Operations and Infrastructure				
Research Reactor Facility Operations & Maintenance	84,000	104,500	116,100	137,900
MARF Defueling and Layup	102,100	40,000	0	0
Laboratory Facility Regulation, Compliance, & Protection	173,279	176,036	183,359	190,828
Nuclear Spent Fuel Management	189,751	212,037	222,875	228,649
Radiological/Environmental Remediation & Demolition	141,323	150,000	158,000	142,600
Technical Infrastructure Operations Support	21,000	21,500	18,100	18,400
Capital Equipment	14,400	200	1,800	100
Minor Construction	60,935	84,340	74,130	61,210
Total, Naval Reactors Operations and Infrastructure	**786,788**	**788,613**	**774,364**	**779,687**
Naval Reactors Development				
Ship Construction & Maintenance Support	37,000	38,000	39,100	43,900
Nuclear Reactor Technology	306,551	308,257	335,239	357,648
Reactor Systems & Component Technology	433,181	442,646	461,739	490,939
Advanced Test Reactor Operations	94,750	96,740	98,770	100,840
Capital Equipment	19,200	22,600	26,200	20,400
Total, Naval Reactors Development	**890,682**	**908,243**	**961,048**	**1,013,727**
S8G Prototype Refueling	**0**	**0**	**0**	**0**
Columbia-Class Reactor Systems Development	**45,610**	**35,300**	**29,700**	**0**
Program Direction	**65,848**	**71,115**	**72,893**	**74,716**
Construction	**398,672**	**328,970**	**238,080**	**237,170**
Total, Naval Reactors	**2,187,600**	**2,132,241**	**2,076,085**	**2,105,300**

Naval Reactors
Explanation of Major Changes
($K)

Naval Reactors	FY 2024 Request vs FY 2023 Enacted
Naval Reactors Operations and Infrastructure: This increase (+7%) supports preparing for defueling and inactivation of the Modifications and Additions to Reactor Facilities (MARF) prototype, progression toward achieving remediation goals in decontamination and decommissioning, continued recapitalization of infrastructure, and increasing efforts to prepare for delivery of the Naval Spent Fuel Handling Facility.	+42,234
Naval Reactors Development: This increase (+12%) supports development of the methods, models, materials, components, and systems required for future platforms to achieve enhanced capability, improved affordability, and sustained reliability, and provides continuous support to U.S. Navy fleet operations.	+92,340
S8G Prototype Refueling: This decrease (-100%) is consistent with the project's funding profile completing in FY 2023.	-20,000
***Columbia*-class Reactor Systems Development:** This decrease (-2%) is consistent with the project's planned funding profile and supports FY 2024 production, analysis, and testing execution.	-1,000
Program Direction: This funding increase (+5%) includes increases for personnel and pay related costs, travel requirements, and IT hardware and maintenance operations.	+3,015
Construction: This decrease (-44%) is consistent with the Program's planned construction funding profile, supporting one new starting in FY 2024, the updated funding profile for the Spent Fuel Handling Recapitalization Project that has recently re-baselined, and funding to complete two ongoing projects at the Knolls site.	-234,934
Total, Naval Reactors	**-117,345**

Naval Reactors
Naval Reactors Operations and Infrastructure

Description

The Naval Reactors Operations and Infrastructure resources ensure Naval Reactors maintains an integrated and effective enterprise across program sites located in Pennsylvania, New York, and Idaho, to provide safe and environmentally conscious operation of the nuclear fleet. The Naval Reactors Operations and Infrastructure program resources provide funding for work associated with the operation of one land-based nuclear prototype and lay-up of one land-based prototype at the Kesselring Site located in West Milton, NY; two dedicated, government-owned, contractor-operated laboratory facilities, Knolls and Bettis located in Niskayuna, NY and West Mifflin, PA, respectively; and naval spent nuclear fuel handling facilities and operations at the Naval Reactors Facility at the Idaho National Laboratory in Idaho. These resources fund work that ensures unique Naval Reactors' infrastructure and advanced naval nuclear capabilities are maintained well into the future. These efforts include:

- Operation, maintenance, and lay-up of the DOE land-based prototypes supporting technology development and nuclear operator training.
- Planning and preparations to defuel the MARF prototype and perform the necessary work to leave the plant in a benign condition for eventual disassembly.
- Activities to ensure Naval Reactors program operations meet or exceed applicable federal, state, and local standards and requirements.
- Disposition of naval spent nuclear fuel from the inactivation and refueling of ships.
- Remediation, dismantlement, and disposal of inactive Naval Reactors program systems, facilities, and areas.
- Providing technical infrastructure support at laboratory facilities enabling technical work supporting the operations of the fleet as well as design and development efforts.
- Design and procurement of capital equipment.
- Design and construction of facilities and infrastructure to provide for capacity, security, safety, environmental, and obsolescence needs.

<u>Research Reactor Facility Operations & Maintenance</u>

The mission of this subprogram is to support one land-based prototype located at the Kesselring Site in New York through the following work efforts: (1) Test and examine reactor materials, components, systems, and new design applications under actual operating conditions. (2) Provide a ship-like operating platform to train nuclear operators. (3) Support improved design activities for the operating prototypes and perform systematic preventive maintenance, corrective maintenance, upgrades, and modifications on the prototypes and their support equipment. (4) Evaluate problems using engineering tests and other troubleshooting techniques. (5) Procure and maintain adequate spare parts, material, specialized tools, and instrumentation for troubleshooting and prototype testing.

<u>MARF Defueling and Layup</u>

The mission of this subprogram is to defuel and layup the MARF prototype in order to place the plant in a safe and benign condition for eventual dismantlement and off-site disposal. The requested funds permit: (1) Design and construction of defueling facilities, (2) Preparation and staging of required equipment for defueling, and (3) Training and proper execution of defueling activities.

<u>Laboratory Facility Regulation, Compliance & Protection</u>

The mission of this subprogram is to ensure that Naval Reactors operations and design activities meet or exceed applicable federal, state, and local standards and requirements, such as Radiological Controls, Environmental, Safety and Health, Quality Assurance, and Nuclear Materials Management. This compliance is accomplished by: (1) Personnel training, instruction, supervision, independent oversight, and formal auditing. (2) Extensive personnel and environmental sampling and monitoring programs to ensure operations have no discernible impact on human health or the environment. (3) Preparing and issuing numerous reports required by federal, state, and local regulations and requirements. (4) Reviewing of new and existing nuclear plant design and the related procurement of nuclear fuel and new project equipment. Naval Reactors' radiological workforce is a highly trained group, capable of responding in the event of a radiological accident, as well as supporting routine radiological operations. Funding is also provided for contractor fixed services that support Naval Reactors operations on laboratory facilities (e.g., network infrastructure) and the integrated nature of Naval Reactors and the Naval Nuclear Laboratory (NNL).

Nuclear Spent Fuel Management
The mission of this subprogram is to fulfill Naval Reactors' cradle-to-grave responsibility for aspects of naval nuclear propulsion by properly managing naval spent nuclear fuel (NSNF). Specifically, resources in this subprogram support the safe reception, handling, preparation, packaging, and temporary storage of NSNF coming from the nuclear-powered fleet and prototypes. This includes fuel handling operations at Department of Energy facilities, mechanically processing NSNF at the Naval Reactors Facility (NRF) in the State of Idaho, packaging the NSNF for dry storage in a geologic repository or interim storage facility, and disposing of the radiological waste by-products produced by these processes. The subprogram also supports nuclear-powered warship deployments by managing Naval Reactors NSNF shipping container capacity for aircraft carrier and submarine refueling overhauls and defueling inactivation operations; conducts destructive and non-destructive examinations of expended naval cores and irradiated test specimens from the Advanced Test Reactor located at the Idaho National Laboratory; and manages the construction of projects that directly support improvements to the NSNF receiving, processing, packaging, and disposal efforts, reducing radiological risks at the NRF.

Radiological/Environmental Remediation & Demolition
The mission of this subprogram is to remediate, dismantle, and dispose of inactive Naval Reactors systems, facilities, and areas that once supported research and development, design, testing, training, and prototype operations. Requirements are prioritized based on a criteria model that ensures currently available funding is provided to projects most critical to Naval Reactors with emphasis on balancing factors such as risk reduction and inactive facility lifecycle costs.

Technical Infrastructure and Operations Support
The mission of this subprogram is to support laboratory and testing facilities at NNL to enable the technical work supporting the operations of the naval nuclear fleet, as well as engineering and development efforts required to ensure continued performance, safety and reliability, and resolution of emergent fleet problems. This includes the preparation and maintenance of infrastructure at program laboratory sites (e.g., laboratory space/building, test loops, hot cells) to support Program technical work (e.g., testing, engineering and analysis, design, and examinations). The upfront work needed to prepare laboratory facilities is distinct from operating the systems or test programs within such facilities (e.g., actual execution/performance of the test once a test loop has been prepared). Technical infrastructure, such as test loops, are large in size and require significant infrastructure (e.g., building dimensions, utilities, and design safety calculations support) in order to prepare the tests for safe operations. The skills required to engineer and maintain technical infrastructure are similar to the skills used to support general facility infrastructure (e.g., general office buildings), and test engineers work collaboratively with site facilities engineers to maintain safe and reliable test operation.

Capital Equipment
The mission of this subprogram is to provide the critical technical tools and equipment to ensure that Naval Reactors can achieve its mission. This subprogram includes MIE (major items of equipment) and non-MIE. Capital equipment is defined as non-construction related equipment, computer systems, tooling, and furniture or fixtures having useful life of two or more years and costing greater than $500,000, consistent with Departmental policy. The tools and equipment are required to support the other work efforts within the sub-categories of Naval Reactors Operations and Infrastructure (e.g., operator training and facilities maintenance).

Minor Construction Projects
The mission of this subprogram is to execute minor construction projects of a general nature, the Total Estimated Cost of which may not exceed the established minor construction threshold. Minor construction projects are necessary to adapt facilities to new or improved production techniques, to effect economies of operations, and to reduce or eliminate health, fire, and security vulnerabilities. These projects provide for design and construction, additions, and improvements to land, buildings, and utility systems, and they may include construction of new buildings, recapitalizing utilities and infrastructure, and general area improvements. Funding is derived from established site construction plans and may be used for emergent and unforeseen infrastructure needs.

Highlights and Major Changes in the FY 2024 Budget Request
The increase of $43,234,000 supports preparing for defueling and inactivation of the MARF prototype, progression toward achieving remediation goals in decontamination and decommissioning, continued recapitalization of infrastructure, and increasing efforts to prepare for delivery of the Naval Spent Fuel Handling Facility.

FY 2025-FY 2028 Key Milestones

Research Reactor Facility Operations and Maintenance

- Obtain core depletion data from the land-based prototype to validate designs and methods of current operating fleet cores.
- Perform maintenance on the land-based prototype, including replacement of major reactor plant, steam plant, and safety system components.
- Conduct core test programs and evaluations on the land-based prototype to validate current and future fleet core designs/methods as well as prototype reactor core performance.
- Conduct testing of electronic power generation and conversion units deployed in the fleet and provide test bed for software and hardware upgrades prior to fleet deployment to ensure that problems with new technologies and designs are resolved before broader application and do not affect the deployed nuclear fleet.
- Develop technology for future fleet deployment with the use of chemistry automation testing that provides improved data and reduced time and exposure requirements for future fleet application.
- Operate and maintain Engineered Safety Features System.
- Return land-based prototype to the normal periodic overhaul and maintenance to maximize availability for design, testing, and operations in support of existing and new technologies.

MARF Defueling and Layup

- System preparation and plant disassembly.
- Execute fuel removal, shipment to NRF and plant layup.
- Package and ship out M-140 spent fuel shipping container

Laboratory Facility Regulation, Compliance & Protection

- Administer radiological controls, including radiological monitoring, radiological engineering, radiation health, radiological controls training, and auditing.
- Provide regulatory compliance oversight and auditing in environmental programs, environmental monitoring, safety, and industrial hygiene.
- Operate mixed, hazardous, and radiological waste storage and processing facilities.
- Prepare waste shipment for treatment or disposal.
- Develop tools and training for organizations to apply Program quality of work principles, quality system requirements, and NR program standards to NNL work.
- Perform internal audits and inspections of NNL work.
- Provide oversight of suppliers for NNL procurements.
- Establish and maintain policies and procedures for nuclear material control and accountability and nuclear criticality safety.
- Sustain regulatory and compliance programs and project support at all Naval Reactors sites.

Nuclear Spent Fuel Management

- Package spent fuel canisters of NSNF into dry storage to support an agreement with the State of Idaho for NSNF located in water pool storage for a period less than six years.
- Mechanically process NSNF modules for placement into dry storage to support legal requirements in the agreement with the State of Idaho.
- Load sleeves of NSNF for packaging method B disposal to support legal requirements in the agreement with the State of Idaho.
- Receive, unload, and return for next use or ultimate disposal, shipping containers of NSNF to support aircraft carrier and submarine refuelings/defuelings and inactivation operations.
- Deliver processing and packaging hardware, fuel handling equipment, and fuel handling procedures in support of NSNF, and Packaging Method B dry storage campaigns.
- Train personnel and checkout equipment/procedures for commencement of operations in the Naval Spent Fuel Handling Facility.

Radiological/Environmental Remediation & Demolition

All sites:

- Conduct stabilization and remediation of inactive NR Program contaminated systems, facilities, and areas to reduce potential environmental liabilities and prepare for future major demolition.
- Continue execution of NNL, NR, and Department of Energy-Environmental Management (DOE-EM) collaborative tasks that support facility turnover to DOE-EM, including but not limited to site walkdowns, project scoping, project schedules, establishment of supporting infrastructure, utility re-routes, historical preservation, and environmental evaluations.

Bettis Laboratory (BL):

- Complete multiple waste load-out campaigns in the Materials Evaluation Laboratory.
- Establish DOE-EM field office and turnover initial liabilities in the C-Area to DOE-EM.

Naval Reactors Facility (NRF):

- Complete dismantlement of the S1W Prototype Complex.
- Commence dismantlement of A1W Prototype Complex.

Knolls Laboratory (KL):

- Continue environmental remediation to support United States EPA and New York State Department of Environmental Conservation (NYSDEC) initiatives for Solid Waste Management Units and Area of Concerns identified, in accordance with NYSDEC approved Corrective Action work schedules.
- Execute abatement of asbestos in numerous radiologically controlled spaces throughout the site.
- Complete capping of the Knolls Laboratory Land Disposal Area and prepare required regulatory reports.
- Complete F Complex demolition.
- Provide engineering/technical support of Lower-Level Riverview Test Facility Projects turnover to DOE-EM.

Kesselring Site (KS):

- Complete D&D of multiple legacy industrial facilities in the southeast quadrant of the site.
- Commence D&D of Hortonsphere complex.
- Complete component removal and cleanout of the MARF Engine Room.

Technical Infrastructure and Operations Support

- Consolidate laboratory workforce efforts while transitioning operations in an effort to complete Knolls, Bettis corrosion testing consolidation by FY 2031, which will add efficiencies and reduce future costs for the program.
- Provide engineering for the transition of thermal-hydraulic testing operations from existing laboratories at the Knolls and Bettis sites into the Component Test Complex for consolidation of thermal-hydraulic testing.
- Design, procure, assemble, execute and complete thermal fluids tests that provide unique data from advanced experimental technologies to remove excess conservatism and reduce uncertainty in reactor design thermal methods.

Capital Equipment

- Laboratory Network Upgrades; replaces network infrastructure which provides basic connectivity for every IT system used in the NR Program. Nearly every enterprise application, database, file repository, website, etc. is connected through this network infrastructure.

Minor Construction Projects

- BL Outfall 001 New Detention Basin
- KL 002 Outfall
- KL RML Building Envelope
- KL RML HVAC
- KS CAS Relocation
- KS Radio Upgrade
- NRF Transporter Path
- NRF Expended Core Facility (ECF) Electric Heat Conversion
- NRF Utility Expansion Northeast
- NRF Integrated Electric Heat Conversion

FY 2022 Accomplishments

- Finalized the MARF defueling layup availability inactivation work package and key planning requirements.
- Prepared detailed plans for starting operations in the new Spent Fuel Handling Recapitalization Project facility.
- Packaged 4 spent fuel canisters into dry storage to support meeting time requirements in an agreement with the State of Idaho for NSNF located in water pool storage.
- Mechanically processed 59 NSNF modules for placement into dry storage to support legal requirements in the agreement with the State of Idaho.
- Loaded 16 sleeves of NSNF for packaging method B disposal to support legal requirements in the agreement with the State of Idaho.
- Received, unloaded, and returned for next use or ultimate disposal 5 shipping containers of NSNF to support aircraft carrier and submarine refuelings/defuelings and inactivation operations.
- Performed corrosion and environmental degradation testing of primary plant materials in normal and off-nominal environments supporting emergent fleet issues, material development efforts, and computational material models development efforts.
- Achieved on-time completion of the second schedule milestone (removal of the secondary shield) of the D1G Prototype dismantlement project.
- Completed remediation of the D1G Ditch.

Naval Reactors
Naval Reactors Development

Description
The Naval Reactors Development (NRD) resources fund work that ensures the current and future fleet is the most advanced, well-maintained, and capable nuclear fleet in the world. This funding supports unique technologies used in naval reactors that are crucial to delivering superior navy fleet operations and dominance in the maritime domain to counter the increasing threats from our adversaries. These efforts include:

- Supporting naval operations and strategic mission needs by providing technical support to the fleet and ensuring safe reactor operations through engineering solutions to emergent reactor plant issues, enabling equipment replacement and maintenance, and tracking reactor performance over time.
- Developing and enhancing the fundamental methods, modeling, and materials used in reactor cores and plants, which reduce lifecycle costs and improves performance.
- Designing and maintaining the major reactor plant components and plant systems required for technologically superior naval nuclear propulsion.
- Provide funding for the operation of the Advanced Test Reactor (ATR) to DOE Office of Nuclear Energy and performing irradiation testing for ongoing evaluation of new material applications and core designs.
- Designing and procuring capital equipment in support of the work above.

<u>Ship Construction & Maintenance Support (SCMS)</u>
The mission of this subcategory is to directly support both the operation and new construction of the nuclear-powered fleet. Operating reactors require continuous mechanical, thermal, hydraulic, materials, and chemistry analyses to fully evaluate the impact of existing design features, core materials, and system modifications on reactor performance and to ensure safe operation throughout the life of the core. While overall fleet support efforts are funded across all Naval Reactors Development subprograms (excluding the Advanced Test Reactor), SCMS supports direct efforts. This includes analyses to extend the reactor operational life of a ship, reactor servicing technical support, new instrumentation and control system qualification prior to ship installation, emergent problem resolution arising during propulsion plant component manufacturing, installation, testing or operation, and continued technical validation of a ship's reactor performance and safety basis through operational life of the ship. Also, maintenance of the reactor plants involves designing equipment and systems to safely handle new fuel and highly radioactive spent fuel, including safely maintaining plant components and resolving emergent obsolescence issues. These efforts are closely associated with the more comprehensive technology efforts that underpin NR's fleet support efforts in Nuclear Reactor Technology (NRT) and Reactor Systems & Component Technology.

<u>Nuclear Reactor Technology</u>
The mission of this subcategory is to develop and deploy core material systems that improve nuclear safety, stealth capability, tactical ability, and reactor plant capability and performance; and to support the qualification of the manufacture of those systems at the naval nuclear core vendor. The materials testing executed using NRT resources forms the basis for naval nuclear reactor operational capability, which has enabled over 65 years of safe nuclear reactor operations while increasing reactor plant performance and reducing platform lifecycle cost. This research and development capability informs new design decisions and enables timely response to issues encountered in the operating fleet. Advanced fuel and poison development efforts, including specimen manufacture, irradiation testing, and post irradiation examination, are executed using resources from this subcategory. Lastly, this subcategory supports the examination of expended fuel modules and irradiated core components at the Expended Core Facility located at the Naval Reactors Facility, which is part of the Idaho National Laboratory. This examination capability provides real performance data on hardware to ultimately understand both long-term material behavior and design impacts.

<u>Reactor Systems & Component Technology</u>
The mission of this subcategory is to provide Naval Reactors with the technology for major reactor plant components (e.g., steam generators, reactor coolant pumps, valves) as well as plant systems (e.g., instrumentation and control). This subcategory provides the support and expertise necessary to ensure the satisfactory operation of reactor plant components in the naval nuclear fleet and prototypes, to design and implement *Virginia*-class and *Ford*-class reactor plant components, and to develop higher power density, faster to build, and more affordable components for technology insertion applications in existing ship classes. The major objectives of instrumentation and control component and system development are to

deliver the next generation of instrumentation, control, and electrical equipment for naval nuclear propulsion applications to improve ship mission capabilities, reactor safety, and widen the advanced technology gap over our adversaries. This subcategory also enables the Program's advanced technology incubator effort to accelerate the pace of R&D that holds promise for step-change advancements and asymmetrical warfighting advantages for naval nuclear propulsion.

Advanced Test Reactor Operations
The mission of this subcategory is to provide a prototypical thermal irradiation environment to support core design, manufacturing development, fleet support, and analytical model development for reactor materials and nuclear fuels. The ATR is a test reactor facility owned by the DOE Office of Nuclear Energy and operated by its contractor. Naval Reactors has sole use of five of nine ATR test loops. This subprogram provides the majority of the ATR's base operations funding.

Capital Equipment
The mission of this subcategory is to provide the critical technical tools and equipment to ensure that Naval Reactors can achieve its mission. This subprogram includes both MIE (major items of equipment) and non-MIE. Capital equipment is defined as non-construction related equipment, computer systems, tooling, and furniture or fixtures having a useful life of two or more years and costing greater than $500,000, consistent with Departmental policy. The tools and equipment are required to support other work efforts within the subcategories of Naval Reactors Development (e.g., designing and testing of reactor plant systems, developing new technologies).

Highlights and Major Changes in the FY 2024 Budget Request
The increase of $92,340,000 supports development of the methods, models, materials, components, and systems required for future platforms to achieve enhanced capability, improved affordability, and sustained reliability and provides continuous support to U.S. Navy fleet operations. Recent increases in this area of NR's budget come at a pivotal time for the NR Program, in which over the last decade, the need for generational investment in infrastructure, which is not yet complete, required a reduction in mid- to long- term technology development efforts. During this time, historic technology development efforts were leveraged to support *Columbia*-class design and existing nuclear-powered submarines and aircraft carriers in the fleet. In order to account for deferred technology R&D to support infrastructure investments, Naval Reactors must identify and develop cutting-edge technologies to aggressively improve propulsion plant capability and dramatically reduce design, acquisition, and lifecycle cost and timespans. This investment in R&D is a critical step in maintaining the Navy's dominance in the maritime domain.

FY 2025-FY 2028 Key Milestones
Ship Construction & Maintenance Support
- Validate reactor performance and safety basis through operational life of *Los Angeles*-class, *Ohio*-class, *Virginia*-class, *Seawolf*-class, *Nimitz*-Class, and *Ford*-class ships.
- Perform thermal and mechanical analyses to extend the reactor and propulsion plant operational life of the submarine fleet and carrier fleet, ensuring the overall number of nuclear ships continues to meet strategic requirements. This includes service life extension work for *Los Angeles*-class, *Ohio*-class, and *Nimitz*-class.
- Perform integrated reactor plant analysis and instrumentation and control system qualification prior to ship installation to ensure safe and reliable operation.
- Support resolution of fabrication or shipyard issues for reactor equipment in production.
- Support emergent obsolescence management issues of technology and equipment pertaining to construction and maintenance support.

Nuclear Reactor Technology
- Support manufacture of the first *Columbia*-class reactor core and continued manufacture of *Virginia*-class and *Ford*-class reactor cores.
- Deliver Electro-Discharge Machining (EDM) equipment as a modern replacement for Expended Core Facility underwater milling equipment for fuel separation. EDM will provide more inherent safety features and more efficient, automated processing capability.
- Perform core examinations on structural and fuel materials of a land-based prototype core informing operating Fleet performance and new design decisions.
- Operate, upgrade, and maintain material testing and examination capabilities. These capabilities enable maintaining reactor plant safety for new materials and manufacturing deviations which minimizes impact to ship's operating availability.

- Execute vendor manufacturing development necessary to scale up improvements in fuel and core manufacturing to increase yields, increase efficiency, and reduce cost. This requires transfers and implementation at production facilities of laboratory-designed specialized equipment and processes.
- Complete core physics exams in operating ships to confirm reactor operating lifetime performance.
- Complete conceptual design for long-term continuity of expended core testing and examination capabilities. Examination of naval spent cores is critical to validating the safe operation of cores in the fleet, resolving technical issues, refining analytical models, and establishing spent fuel shipping requirements.

<u>Reactor Systems & Component Technology</u>

- Develop predictive methodologies and data analytics for evaluation of in-service components in order to reduce lifecycle costs (e.g., reduce total planned nuclear maintenance workload of the fleet by 30%), optimally schedule repairs and thereby increase operational availability.
- Develop and implement advanced instrumentation & control systems exploiting passive cooling, enhanced cybersecurity features, and increased computational capability for fleet applications to increase performance and reduce acquisition and lifecycle costs.
- Research, develop, and test new sensor technologies for integration into existing and future propulsion plants in order to better enable predictive maintenance, and improve accuracy and plant responsiveness, increased sensor density (e.g., more sensing elements per instrument), thereby reducing required number of sensors while enhancing operator-assisted control systems and operational reliability.
- Develop and integrate technologies (e.g., advanced power conversion equipment) to improve shipboard power density and efficiency, enabling more capable and compact systems (e.g., reducing electrical component cabinet volume by up to 50%), and thereby reducing weight and hull size impacts.
- Develop and qualify advanced manufacturing capabilities, such as powder metallurgy hot isostatic pressing (PM-HIP) and additive manufacturing (AM), to manufacture components for near-term operating platform insertions. These manufacturing technologies enable performance-enhancing designs with unique or complex geometries while reducing cost and production timespan and improving resilience of the industrial base.
- Design, build, test, and qualify improved heat exchangers for reactor plant application, with the goal of increasing power density to enhance capability, lower cost, and reduce ship weight and hull size impacts.
- Complete qualification of advanced materials to retire existing material risks in the aging fleet, to improve design of future platforms, and to eliminate ship operational constraints due to material concerns.
- Complete a physically-based material modeling program to improve operational availability, decrease maintenance burden, and optimize performance of plant components.
- Establish external technology incubation sources to identify relevant emergent technologies (e.g., artificial intelligence, advanced robotics, energy storage) that potentially provide a step-change in naval nuclear plant competitive advantage.
- Perform reactor plant conceptual arrangements and component sizing/cost reduction studies in support of overall Navy trade studies aiding the Navy's Analysis of Alternatives (AoA) for SSN(X).
- Develop, improve, and employ reactor design, analysis, and simulation software tools for new plants to improve capability while reducing cost and development time.
- Develop radiation shield methods and perform analyses for reactor plants, and radioactive material handling equipment and facilities; and, verify their effectiveness through shield surveys.
- Provide structural analyses and assessments for new designs and existing fleet to ensure propulsion continuity and safe operation under battle shock and ship maneuvering transients.
- Perform testing and analysis of noise sources in components and develop tests to improve propulsion plant acoustics and submarine stealth.
- Continue to monitor and redesign components and integrated systems as necessary to remove future emergent obsolescence issues.

<u>Advanced Test Reactor Operations</u>

- Perform operations, maintenance, and engineering support work necessary to operate the ATR for a target of 210 days per year (three 60-day irradiation test cycles and up to two transient tests). These test cycles are necessary to obtain data to define performance limits of fuel fabricated from existing fuel manufacturing technologies and support continued safe reactor operations.

- Safely handle, ship, and receive 14 irradiation test trains per year from the Naval Reactors Facility where irradiations test specimens are assembled and examined. This work is necessary as part of preparing new Navy test specimens for the ATR and inspecting and characterizing specimens that have been irradiated.
- Procure nuclear fuel and spare parts to support ATR operations.
- Refurbish the components and infrastructure to bring a currently unusable ATR test loop back into service. This refurbishment will allow test conditions that support advanced fuel system development and will enable subsequent refurbishment of other operating test loop equipment and infrastructure to improve ATR reliability. The funding for the first refurbishment is categorized under Nuclear Reactor Technology.

Capital Equipment
- Procure High Performance Computing equipment to enable design and analysis workload to be completed at a much lower cost than physical tests.
- Procure, design, and install three steam-water test loops (TH1/2/3) for thermal and hydraulic testing, delivering three loops with new technologies into a state-of-the-art facility, consolidating thermal hydraulic testing into one location.
- Procure a state-of-the-art metal Additive Manufacturing machine to support continued development of AM and enable rapid design iteration of pre-production components.

FY 2022 Accomplishments
- Core design and analyses supported continued safe and reliable operation of reactors across the fleet.
- Performed and coordinated expended core examinations. These examinations determined performance of actual operating naval cores.
- Continued development of new manufacturing processes (PM-HIP and AM), executing targeted material testing to validate key performance attributes in a shorter time than prior material qualification efforts.
- Progressed development of the next generation reactor fuel system at both the laboratory and core vendor, including demonstrating initial feasibility of the manufacturing process concept.
- Accelerated the Program's advanced technology incubator effort to develop technologies that enable a step-change in competitive advantage for naval nuclear propulsion plants.
- Performed operations, maintenance, and engineering support work for the ATR to complete Core Internals Changeout, a once-per-decade maintenance effort.
- Safely shipped and received four Naval Reactors program irradiation test trains.
- Developed and tested radiation analysis automation tools and shield design processes to reduce reactor plant shield design effort for future reactor plant shield designs enabling reductions in radiation analysis costs for fleet support requests and reactor servicing evolutions for all naval reactor plants.

Naval Reactors
S8G Prototype Refueling

Description

The land-based prototype located at the Kesselring Site in West Milton, New York serves as a critical operating reactor to demonstrate technology advancements for fleet application. The land-based prototype requires a refueling overhaul, which began in FY 2018. Originally built as a prototype for the *Ohio*-class submarine propulsion plant, this testing platform has been integral to the development of technologies used for the *Virginia* Class and *Seawolf* Class, which have resulted in improved performance and reliability while reducing lifecycle costs. Continued operation of this land-based prototype and development of advanced core technology will enable extended core lifetimes, more efficient use of nuclear fuel, greater compactness, and cross-platform adaptability. By constructing the replacement Technology Demonstration Core (TDC) for the prototype with technologies planned for the *Columbia* Class, technical, cost, and schedule risks to the ship construction program will be mitigated. The manufacturing development, technology demonstration, and new core technologies development began in FY 2010.

Overhaul of reactor and steam plant systems will be performed in conjunction with the land-based prototype refueling overhaul. System overhaul includes the required preventative and corrective maintenance to support subsequent plant operations. In addition, establishing critical site infrastructure to support the Land-based Prototype Refueling Overhaul is required to enable safe and efficient execution of the overhaul.

The land-based prototype reactor plant provides a cost-effective test and evaluation platform, for new technologies, materials, and components before they are introduced to the fleet, and a vital training platform for reactor plant operators. To preserve this critical research and development asset for the long-term and to achieve a life-of-ship core for the *Columbia*-Class, the refueling overhaul execution effort will be completed in 2023 to support operator training and proof-of-concept for the *Columbia*-Class core.

Highlights and Major Changes in the FY 2024 Budget Request

The decrease of $20,000,000 is consistent with the project's planned funding profile with no request in FY 2024 reflective of the project's planned completion in 2023.

FY 2025-FY 2028 Key Milestones

- N/A; the project will have completed and achieved all objectives.

FY 2022 Accomplishments

- Completed restoration and reassembly of the new design reactor head area.
- Completed installation and initial energization of a unique Type II Instrumentation and Control system.
- Completed the testing of new processed cooling water system towers to support the continuation of the land-based prototype reactor.

Naval Reactors
Columbia-class Reactor Systems Development

Description

Ohio-class ballistic missile submarines (SSBNs) have been the backbone of the Nation's sea-based strategic deterrent since the early 1980s. Recapitalization of this strategic asset is required as the *Ohio* Class retires. With the *Columbia* Class, the Navy plans to maintain its sea-based strategic deterrent force with a class of 12 ships, two fewer than today's *Ohio* Class, due in part to a life-of-ship-core. This new life-of-ship core will eliminate the need for mid-life reactor refuelings (mid-life refueling overhauls are an over-three-year evolution during which the ship is unavailable for service). By increasing class operational availability, development of a new reactor plant for the *Columbia* Class will permit 12 *Columbia*-class submarines to do the work of 14 *Ohio*-class submarines–an operational and sustainment savings of over $40 billion over the life of the class.

Research, development, and design for the *Columbia*-class SSBN began in FY 2010. The new design will leverage *Virginia*-class technology, as well as manufacturing development and demonstration efforts being performed as part of the land-based S8G Prototype Refueling Overhaul program. NR must design a new reactor plant to meet the Navy's required capabilities, maximize operational availability, and reduce acquisition and lifecycle costs. The DOE reactor plant design and development work for the *Columbia* will continue in FY 2024 and beyond to include oversight of the manufacture of lead ship reactor plant components, including the core, and conduct the requisite safety analysis for the lead ship reactor plant.

Work to support the *Columbia*-class SSBN is tightly synchronized with Navy-funded propulsion plant work. The DOE-funded design work includes reactor plant component design and development, core design analysis and manufacturing development, reactor plant instrumentation and control design and development, reactor plant configuration, reactor systems development and integration, and reactor performance, analysis, and validation. Lead submarine construction began in FY 2021. NR requests $52,900,000 for this effort in FY 2024.

Highlights and Major Changes in the FY 2024 Budget Request

The decrease of $1,000,000 is consistent with the project's planned funding profile and supports FY 2024 production, oversight analysis, and testing execution.

Naval Reactors
Program Direction

Description

Due to the essential nature of nuclear reactor work, Naval Reactors provides centrally controlled, technical management of program operations. Federal employees directly oversee and set policies and procedures for developing new reactor plants, operating existing reactor plants, facilities supporting these plants, contractors, and the Bettis and Knolls Atomic Power Laboratories. In addition, these employees interface with other DOE offices and local, state, and federal regulatory agencies.

Naval Reactors' federal employees are typically recruited from a community of highly trained military engineers who have completed a rigorous five-year on-the-job training program unique to Naval Reactors. This training program has groomed engineers with skill sets far beyond that of nuclear engineers found in the commercial and federal sectors.

Travel funds are used to perform oversight activities of facilities located worldwide that require comprehensive audits and in-person visits to ensure compliance and safety. Additionally, Naval Reactors Representative positions at the field sites (to include locations in the United Kingdom, Japan, Hawaii, and the continental United States) rotate periodically due to retirements, attrition, and succession planning.

Other Related Expenses includes the maintenance of Naval Reactors' IT hardware, engineering software, working capital funding, and related licenses supporting mission-essential technical work. Additionally, these funds will support planned upgrades and maintenance of video teleconferencing equipment, security investigations of federal personnel, and training requirements.

Highlights and Major Changes in the FY 2024 Budget Request

The increase for the Naval Reactors Program Direction budget includes general increases for personnel and pay related costs and IT hardware and maintenance. Additionally, NR will continue to reshape the workforce to manage knowledge transfer to ensure the accomplishment of the NR mission.

FY 2025-FY 2028 Key Milestones

- NR plans to continue developing its highly technical workforce to ensure the NR mission is preserved well into the future. Out year increases in full time equivalents (FTEs) supports next generation attack submarine program design start.

FY 2022 Accomplishments

- Provided for all facets of administrative control and oversight of the Naval Nuclear Propulsion Program ("Naval Reactors"), including developing and overseeing substantial modifications and improvements to management and work policies necessitated by the COVID-19 pandemic.

Naval Reactors
Program Direction Funding

	($K)				
	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Naval Reactors					
Headquarters					
Salaries and Benefits	35,089	37,517	39,251	+1,734	4.6%
Travel	480	471	483	+12	2.5%
Other Related Expenses	3,525	3,746	4,346	+600	16.0%
Total, Headquarters	**39,094**	**41,734**	**44,080**	**+2,346**	**5.6%**
Naval Reactors Laboratory Field Office					
Salaries and Benefits	13,815	14,871	15,275	+404	2.7%
Travel	320	314	322	+8	2.5%
Other Related Expenses	2,350	1,606	1,863	+257	16.0%
Total, Naval Reactors Laboratory Field Office	**16,485**	**16,791**	**17,460**	**+669**	**4.0%**
Total Program Direction					
Salaries and Benefits	48,904	52,388	54,526	+2,138	4.1%
Travel	800	785	805	+20	2.5%
Other Related Expenses	5,875	5,352	6,209	+857	16.0%
Total, Program Direction	**55,579**	**58,525**	**61,540**	**+3,015**	**5.2%**
Planned Federal FTEs	**246**	**246**	**246**	**246**	**246**

Naval Reactors
Outyears Program Direction

	($K)			
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Naval Reactors				
Headquarters				
Salaries and Benefits	43,093	47,210	47,083	48,370
Travel	495	507	520	533
Other Related Expenses	4,368	4,860	5,872	5,917
Total, Headquarters	**47,956**	**52,577**	**53,475**	**54,820**
Naval Reactors Laboratory Field Office				
Salaries and Benefits	15,690	16,117	16,555	17,005
Travel	330	338	346	355
Other Related Expenses	1,872	2,083	2,517	2,536
Total, Naval Reactors Laboratory Field Office	**17,892**	**18,538**	**19,418**	**19,896**
Total Program Direction				
Salaries and Benefits	58,783	63,327	63,638	65,375
Travel	825	845	866	888
Other Related Expenses	6,240	6,943	8,389	8,453
Total, Program Direction	**65,848**	**71,115**	**72,893**	**74,716**
Planned Federal FTEs[a]	**246**	**246**	**252**	**252**

[a] Pending final agreements for the Australian – United Kingdom – United States (AUKUS) partnership, some funding may support additional FTEs to maintain sufficient oversight of the U.S. Naval Nuclear Propulsion Program while supporting foreign partners. Further refinement and FTE updates will be provided in future budgets.

Naval Reactors
Program Direction - Other Related Expenses

($K)

Other Related Expenses	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Transportation	962	740	842	+102	13.8%
Communications, Utilities and Miscellaneous Charges	300	405	471	+66	16.3%
Other Services from Federal Sources	1,158	1,107	1,152	+45	4.1%
Advisory and Assistance Services	14	16	19	+3	16.6%
Operation and Maintenance of Facilities	202	238	295	+57	23.9%
Operations and Maintenance of Equipment	226	260	302	+43	16.4%
Supplies and Materials	168	209	243	+35	16.6%
Equipment	907	423	614	+191	45.1%
Working Capital Fund	1,938	1,954	2,271	+316	16.2%
Total, Other Related Expenses	**5,875**	**5,352**	**6,209**	**+857**	**16.0%**

Outyears Program Direction - Other Related Expenses

($K)

Other Related Expenses	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request
Transportation	814	832	998	1,064
Communications, Utilities and Miscellaneous Charges	465	485	595	648
Other Services from Federal Sources	1,136	1,168	1,491	1,617
Advisory and Assistance Services	19	20	24	26
Operation and Maintenance of Facilities	292	306	376	411
Operations and Maintenance of Equipment	299	312	382	417
Supplies and Materials	237	248	299	326
Equipment	738	1,235	1,363	830
Working Capital Fund	2,240	2,337	2,861	3,114
Total, Other Related Expenses	**6,240**	**6,943**	**8,389**	**8,453**

Program Direction
Activities and Explanation of Changes

FY 2023 Enacted	FY 2024 Request	Explanation of Changes FY 2024 Request vs FY 2023 Enacted
Salaries and Benefits $52,388,000	**Salaries and Benefits $54,526,000**	**Salaries and Benefits +$2,138,000**
• Federal salaries and benefits for employees that directly oversee and set policies and procedures for developing new reactor plants, operating existing reactor plants, facilities supporting these plants, contractors, and the Bettis and Knolls Atomic Power Laboratories.	• Federal salaries and benefits for employees that directly oversee and set policies and procedures for developing new reactor plants, operating existing reactor plants, facilities supporting these plants, contractors, and the Bettis and Knolls Atomic Power Laboratories.	• Reflects an increase for personnel and pay related costs as well as anticipated costs of benefits.
Travel $785,000	**Travel $805,000**	**Travel +$20,000**
• Perform oversight activities of facilities located worldwide that require comprehensive audits and in-person visits to ensure compliance and safety. • Rotation of Naval Reactors Representatives at the field sites (U.K., Japan, Hawaii, and the continental United States) due to retirement, attrition, and succession planning.	• Performed oversight activities of facilities located worldwide that require comprehensive audits and in-person visits to ensure compliance and safety. • Rotation of Naval Reactors Representatives at the field sites (U.K., Japan, Hawaii, and the continental United States) due to retirement, attrition, and succession planning.	• Increase reflects expected increase in travel requirement to execute oversight activities.
Other Related Expenses $5,352,000	**Other Related Expenses $6,209,000**	**Other Related Expenses +$857,000**
• Maintenance of Naval Reactors' IT hardware, engineering software, and related licenses supporting mission essential technical work. • Support planned upgrades and maintenance of video teleconferencing equipment, security investigation of federal personnel, and training requirements.	• Maintenance of Naval Reactors' IT hardware, engineering software, and related licenses supporting mission essential technical work. • Supported planned upgrades and maintenance of video teleconferencing equipment, security investigation of federal personnel, and training requirements.	• Increase reflects a rise in PCS costs, and increase in utilities and miscellaneous charges to support IT and maintenance operations.

Naval Reactors
Capital Equipment Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
Capital Equipment > $500K (including MIE)						
Total Non-MIE Capital Equipment (TEC <$5M)	N/A	N/A	1,500	4,200	7,400	+3,200
High Performance Computer (2022 Buy)	5,500	0	5,500	0	0	0
High Performance Computer (2023 Buy)	5,500	0	0	5,500	0	-5,500
High Performance Computer (2024 Buy)	5,500	0	0	0	5,500	+5,500
High Performance Computer (2025 Buy)	5,500	0	0	0	0	0
High Performance Computer (2026 Buy)	5,500	0	0	0	0	0
High Performance Computer (2027 Buy)	5,500	0	0	0	0	0
High Performance Computer (2028 Buy)	5,500	0	0	0	0	0
A1G Buffering Lead Canisters, NRF	16,600	0	0	16,600	0	-16,600
Consolidated Steam Water Test Loops, BL[a]	41,015	0	0	15,505	0	-15,505
M-140 Cranes, Naval Spent Fuel Handling Facility	14,100	0	0	0	0	0
Total, Capital Equipment (including MIE)	**N/A**	**N/A**	**7,000**	**41,805**	**12,900**	**-28,905**

[a] Consolidated Steam Water Test Loops incorporates Test Loop 2 and 3 to the project previously titled "TH Test Loop 1, BL".

Naval Reactors
Outyears for Capital Equipment Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears
Capital Equipment > $500K (including MIE)					
Total Non-MIE Capital Equipment (TEC <$5M)	1,590	17,300	9,400	15,000	N/A
High Performance Computer (2025 Buy)	5,500	0	0	0	0
High Performance Computer (2026 Buy)	0	5,500	0	0	0
High Performance Computer (2027 Buy)	0	0	5,500	0	0
High Performance Computer (2028 Buy)	0	0	0	5,500	0
Consolidated Steam Water Test Loops, BL	12,410	0	13,100	0	0
M-140 Cranes, Naval Spent Fuel Handling Facility	14,100	0	0	0	0
Total, Capital Equipment (including MIE)	**33,600**	**22,800**	**28,000**	**20,500**	**N/A**

Naval Reactors
Construction Projects Summary

($K)

	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
28-D-XXX Core Materials Development Laboratory						
Total Estimated Cost (TEC)	TBD	0	0	0	0	0
Other Project Cost (OPC)	TBD	200	309	1,253	3,429	+2,176
TPC, 28-D-XXX Core Materials Development Laboratory	**TBD**	**200**	**309**	**1,253**	**3,429**	**+2,176**
28-D-XXX KL Central Chiller and Piping						
Total Estimated Cost (TEC)	67,170	0	0	0	0	0
Other Project Cost (OPC)	6,351	50	505	61	4,055	+3,994
TPC, 28-D-XXX KL Central Chiller and Piping	**73,521**	**50**	**505**	**61**	**4,055**	**+3,994**
27-D-XXX NRF South and West Boundary						
Total Estimated Cost (TEC)	36,480	0	0	0	0	0
Other Project Cost (OPC)	6,414	0	1,500	790	3,447	+2,657
TPC, 27-D-XXX NRF South and West Boundary	**42,894**	**0**	**1,500**	**790**	**3,447**	**+2,657**
27-D-XXX BL Manufacturing and Innovation Center						
Total Estimated Cost (TEC)	66,000	0	0	0	0	0
Other Project Cost (OPC)	4,821	393	1,024	510	1,087	+577
TPC, 27-D-XXX BL Manufacturing and Innovation Center	**70,821**	**393**	**1,024**	**510**	**1,087**	**+577**
26-D-XXX East Side Office Building						
Total Estimated Cost (TEC)	62,970	0	0	0	0	0
Other Project Cost (OPC)	1,489	0	598	125	98	-27
TPC, 26-D-XXX East Side Office Building	**64,459**	**0**	**598**	**125**	**98**	**-27**

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
25-D-XXX Naval Examination Acquisition Project						
Total Estimated Cost (TEC)	TBD	0	0	0	0	0
Other Project Cost (OPC)	TBD	30,400	16,000	20,600	27,600	+7,000
TPC, 23-D-XXX Naval Examination Acquisition Project	**TBD**[a]	**30,400**	**16,000**	**20,600**	**27,600**	**+7,000**
24-D-530 NRF Medical Science Complex						
Total Estimated Cost (TEC)	36,584	0	0	0	36,584	+36,584
Other Project Cost (OPC)	2,931	1,499	39	228	208	-20
TPC, 24-D-530 NRF Meical Science Complex	**39,515**	**1,499**	**39**	**228**	**36,792**	**+36,564**
23-D-533 BL Component Test Complex						
Total Estimated Cost (TEC)	57,420	0	0	57,420	0	-57,420
Other Project Cost (OPC)	4,826	3,682	70	1,054	0	-1,054
TPC, 23-D-533 BL Component Test Complex	**62,246**	**3,682**	**70**	**58,474**	**0**	**-58,474**
22-D-532, KL Security Upgrades						
Total Estimated Cost (TEC)	46,770	0	5,100	0	0	0
Other Project Cost (OPC)	2,036	249	136	44	237	+193
TPC, 22-D-532, KL Security Upgrades	**48,806**	**249**	**5,236**	**44**	**237**	**+193**
22-D-531, KL Chemistry and Radiological Health Building						
Total Estimated Cost (TEC)	52,020	0	41,620	0	10,400	+10,400
Other Project Cost (OPC)	4,250	953	988	80	1,990	+1,910
TPC, 22-D-531, KL Chemistry and Radiological Health Building	**56,270**	**953**	**42,608**	**80**	**12,390**	**+12,310**
21-D-530, KL Steam and Condensate Upgrades						
Total Estimated Cost (TEC)	57,000	4,000	0	0	53,000	+53,000
Other Project Cost (OPC)	6,500	803	305	495	3,542	+3,047
TPC, 21-D-530, KL Steam and Condensate Upgrades	**63,500**	**4,803**	**305**	**495**	**56,542**	**+56,047**

[a] Critical Decision (CD)-0, Mission Need, was approved on January 3, 2018, with a total project cost range of $500,000K to $1,266,000K (FY 2018 dollars), which is based on a rough-order of magnitude estimate.

	($K)					
	Total	Prior Years	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)
14-D-901, Spent Fuel Handling Recapitalization Project						
Total Estimated Cost (TEC)	2,823,627	1,253,927	400,000	476,798	199,300	-277,498
Other Project Cost (OPC)	176,373	176,373	0	0	0	0
TPC, 14-D-901, Spent Fuel Handling Recapitalization Project[a]	**3,000,000**	**1,430,300**	**400,000**	**476,798**	**199,300**	**-277,498**
Total All Construction Projects						
Total Estimated Cost (TEC)	3,306,041	1,257,927	446,720	534,218	299,284	-234,934
Other Project Cost (OPC)	215,991	214,602	21,474	25,240	45,693	+20,453
Total Project Cost (TPC) All Construction Projects	**TBD**	**1,472,529**	**468,194**	**559,458**	**344,977**	**-214,481**

[a] The Consolidated and Further Continuing Appropriation Act, 2015 provided funding for Other Project Costs (OPC) within project funds beginning in FY 2015. All prior year funding was OPC. The total amount of the Spent Fuel Handling Recapitalization Project entries is $3,000,000. The FY 2024 CPDS revised the TEC, OPC, and TPC to reflect the October 2022 Performance Baseline Revision.

Outyears for Construction Projects Summary

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
28-D-XXX Core Materials Development Laboratory[a]					
Total Estimated Cost (TEC)	0	0	0	45,000	TBD
Other Project Cost (OPC)	4,572	5,033	6,030	6,380	TBD
TPC, 28-D-XXX Core Materials Development Laboratory	**4,572**	**5,033**	**6,030**	**51,380**	**TBD**
28-D-XXX KL Central Chiller and Piping					
Total Estimated Cost (TEC)	0	0	0	67,170	0
Other Project Cost (OPC)	720	100	530	330	0
TPC, 28-D-XXX KL Central Chiller and Piping	**720**	**100**	**530**	**67,500**	**0**
27-D-XXX NRF South and West Boundary					
Total Estimated Cost (TEC)	0	0	36,480	0	0
Other Project Cost (OPC)	0	0	0	677	0
TPC, 27-D-XXX NRF South and West Boundary	**0**	**0**	**36,480**	**677**	**0**
27-D-XXX BL Manufacturing and Innovation Center					
Total Estimated Cost (TEC)	0	0	66,000	0	0
Other Project Cost (OPC)	105	95	1,480	18	109
TPC, 27-D-XXX BL Manufacturing and Innovation Center	**105**	**95**	**67,480**	**18**	**109**
26-D-XXX East Side Office Building					
Total Estimated Cost (TEC)	0	62,970	0	0	0
Other Project Cost (OPC)	18	530	0	120	0
TPC, 26-D-XXX East Side Office Building	**18**	**63,500**	**0**	**120**	**0**
25-D-XXX Naval Examination Acquisition Project[b]					
Total Estimated Cost (TEC)	65,000	90,000	110,000	125,000	TBD
Other Project Cost (OPC)	10,900	3,200	3,400	3,700	TBD
TPC, 23-D-XXX Naval Examination Acquisition Project	**75,900**	**93,200**	**113,400**	**128,700**	**TBD**

[a] Pre-Conceptual and Conceptual Design is estimated to exceed $45 million.

[b] Critical Decision (CD)-0, Mission Need, was approved on January 3, 2018, with a total project cost range of $500,000k to $1,266,000k (FY18 Dollars), which is based on a rough-order of magnitude estimate. Expected cost of conceptual design is greater than $5 million.

	($K) FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
24-D-530 NRF Medical Science Complex					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	245	365	330	17	0
TPC, 24-D-530 NRF Meical Science Complex	**245**	**365**	**330**	**17**	**0**
23-D-533 BL Component Test Complex					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	0	12	8	0	0
TPC, 23-D-533 BL Component Test Complex	**0**	**12**	**8**	**0**	**0**
22-D-532, KL Security Upgrades					
Total Estimated Cost (TEC)	41,670	0	0	0	0
Other Project Cost (OPC)	595	95	47	633	0
TPC, 22-D-532, KL Security Upgrades	**42,265**	**95**	**47**	**633**	**0**
22-D-531, KL Chemistry and Radiological Health Building					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	239	0	0	0	0
TPC, 22-D-531, KL Chemistry and Radiological Health Building	**239**	**0**	**0**	**0**	**0**
21-D-530, KL Steam and Condensate Upgrades					
Total Estimated Cost (TEC)	0	0	0	0	0
Other Project Cost (OPC)	505	460	283	107	0
TPC, 21-D-530, KL Steam and Condensate Upgrades	**505**	**460**	**283**	**107**	**0**

	($K)				
	FY 2025 Request	FY 2026 Request	FY 2027 Request	FY 2028 Request	Outyears to Completion
14-D-901, Spent Fuel Handling Recapitalization Project					
Total Estimated Cost (TEC)	292,002	176,000	25,600	0	0
Other Project Cost (OPC)	0	0	0	0	0
TPC, 21-D-512, Spent Fuel Handling Recapitalization Project	**292,002**	**176,000**	**25,600**	**0**	**0**
Total All Construction Projects					
TEC	398,672	328,970	238,080	237,170	0
OPC	17,899	9,890	12,108	11,982	TBD
TPC All Construction Projects	**416,571**	**338,860**	**250,188**	**249,152**	**TBD**

Research and Development

The Office of Management and Budget (OMB) Circular No. A-11, “Preparation, Submission, and Execution of the Budget,” requires the reporting of research and development (R&D) data. Consistent with this requirement, Naval Reactors R&D activities funded by NNSA are displayed below.

($K)

	FY 2022 Enacted	FY 2023 Enacted	FY 2024 Request	FY 2024 Request vs FY 2023 Enacted ($)	FY 2024 Request vs FY 2023 Enacted (%)
Research and Development (R&D)					
Basic	0	0	0	+0	0%
Applied	191,110	141,400	137,000	-4,400	-3.1%
Development	616,255	700,073	815,180	+115,107	16.4%
Subtotal, R&D	**807,365**	**841,473**	**952,180**	**+110,707**	13.2%
Equipment	6,900	23,005	8,800	-14,205	-61.7%
Construction	567,620	554,218	246,284	-307,934	-55.6%
Total, R&D	**1,381,885**	**1,418,696**	**1,207,264**	**-211,432**	-14.9%

24-D-530, NRF Medical Science Complex
Naval Reactors Facility, Idaho Falls, ID
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2024 Request for 24-D-530, NRF Medical Science Complex (MSC), is $36,584,000 (Total Estimated Cost (TEC)). The Total Project Cost (TPC) is $39,515,000, inclusive of $2,931,000 in Other Project Costs (OPC). This Construction Project Data Sheet (CPDS) is a new start for the budget year.

A Federal Project Manager (FPM) has been assigned to this project.

Significant Changes

The Original Baseline was approved in 2019. During FY 2021 budget deliberations, Naval Reactors chose to defer the project for three years to prioritize other projects and activities. The Total Project Cost (TPC) of $35,831,000 was approved at Critical Decision (CD)-2 on May 2, 2019, with a CD-4 of 2Q FY 2024. On June 6, 2022, a revision to the TPC was approved with an updated TPC of $39,515,000 to account for changes in economic conditions since the approval of CD-2 in 2019.

Critical Milestone History

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2024	11/10/2016	01/31/2018	08/14/2018	05/02/2019	2Q FY 2025	3Q FY 2023	N/A	3Q FY 2027

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the final design will be/was complete/d
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work
CD-4 – Approve Start of Operations or Project Completion

Project Cost History

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC Except D&D	OPC, D&D	OPC, Total	TPC
FY 2024	2,026	34,558	36,584	2,931	0	2,931	39,515

2. Project Scope and Justification

Scope

This project will construct a new building of approximately 27,000 gross square feet. This building will recapitalize and optimize Medical, Radiation Health, Chemistry, and Quality Assurance capabilities for the current mission at NRF. This includes a medical clinic, laboratory space, and office space for the above group.

Justification

NRF currently houses the operational functions of the Medical, Radiation Health, Chemistry, and Quality Assurance groups. Poorly configured and undersized areas, inability for expansion to accommodate new technology and needs, and an aging building infrastructure has created many vulnerabilities, leaving certain spaces ineffective at meeting the needs of NRF's mission. These spaces include the medical clinic and radiation health facility in NRF-671, the chemistry lab in NRF-616C, and the quality assurance examiners room in NRF-670.

Key Performance Parameters (KPPs)

Performance Measure	Threshold	Objective
1. Provide a facility to meet the Medical clinic functional and space requirements.	MSC to provide a minimum of 2,000 usable square feet of space.	Provide 2,415 usable square feet of space.
2. Provide a facility to meet the Rad Health functional and space requirements.	MSC to provide a minimum of 3,000 usable square feet of space.	Provide 3,550 usable square feet of space.
3. Provide a facility to meet the Chemistry functional and space requirements.	MSC to provide a minimum of 3,000 usable square feet of space.	Provide 4,515 usable square feet of space.
4. Provide a facility to meet the QA functional and space requirements.	MSC to provide a minimum of 4,000 usable square feet of space.	Provide 5,075 usable square feet of space.
5. Provide a facility to meet the MSC building space capacity.	Provide a minimum of 23,535 square gross feet of space.	Provide 60,492 gross square feet of space.
6. Provide a facility to meet the MSC building office capacity.	Provide a minimum of 54 office/cubicle spaces.	Provide 74 office/cubicle spaces.

3. **Financial Schedule**

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Total Estimated Cost (TEC)			
Design			
FY 2024	2,026	2,026	2,026
Total Design	**2,026**	**2,026**	**2,026**
Construction			
FY 2024	34,558	34,558	1,556
FY 2025	0	0	18,524
FY 2026	0	0	11,180
FY 2027	0	0	3,298
Total Construction	**34,558**	**34,558**	**34,558**
TEC			
FY 2024	36,584	36,584	3,582
FY 2025	0	0	18,524
FY 2026	0	0	11,180
FY 2027	0	0	3,298
Total TEC	**36,584**	**36,584**	**36,584**
Other Project Costs (OPC)			
FY 2017	464	464	111
FY 2018	389	389	505
FY 2019	467	467	644
FY 2020	169	169	227
FY 2021	10	10	12
FY 2022	39	39	39
FY 2023	228	228	228
FY 2024	208	208	208
FY 2025	245	245	245
FY 2026	365	365	365
FY 2027	330	330	330
FY 2028	17	17	17
Total, OPC	**2,931**	**2,931**	**2,931**
Total Project Costs (TPC)			
FY 2017	464	464	111
FY 2018	389	389	505
FY 2019	467	467	644
FY 2020	169	169	227
FY 2021	10	10	12

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs
FY 2022	39	39	39
FY 2023	228	228	228
FY 2024	36,792	36,792	3,790
FY 2025	245	245	18,769
FY 2026	365	365	11,545
FY 2027	330	330	3,628
FY 2028	17	17	17
Total TPC	**39,515**	**39,515**	**39,515**

4. Details of Project Cost Estimate

	($K)		
	Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	1,762	1,449	1,449
Contingency	264	217	217
Total Design	**2,026**	**1,666**	**1,666**
Construction			
Construction	28,738	26,683	26,683
Equipment	315	238	238
Contingency	5,505	4,613	4,613
Total Construction	**34,558**	**31,534**	**31,534**
Total Estimated Cost (TEC)	**36,584**	**33,200**	**33,200**
Contingency, TEC	*5,769*	*4,830*	*4,830*
Other Project Costs (OPC)			
OPC except D&D			
Conceptual Design	1,766	1,711	1,711
Prime Contractor Support	1,153	908	908
Start-up/commissioning	12	12	12
Contingency	0	0	0
Total OPC	**2,931**	**2,631**	**2,631**
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**39,515**	**35,831**	**35,831**
Total Contingency (TEC+OPC)	***5,769***	***4,830***	***4,830***

5. Schedule of Appropriation Requests

($K)

Request Year	Type	Prior Years	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2024	TEC	0	0	36,584	0	0	0	0	0	36,584
	OPC	1,538	228	208	245	365	330	17	0	2,931
	TPC	1,538	228	36,792	245	365	330	17	0	39,515

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	3Q FY 2027
Expected Useful Life	50 years
Expected Future Start of D&D of this Capital Asset	3Q FY 2077

Related Funding Requirements ($M)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	0.280	0.280	21.8	21.8

7. D&D Information

The new facility will be constructed on available land. The facilities that are being replaced will undergo D&D under other initiatives and those costs are not included in the costs of this construction project.

	Square Feet
New area being constructed by this project at site	27,000
Area of D&D in this project at site	0
Area at site to be transferred, sold, and/or D&D outside the project including area previously "banked"	27,000
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously "banked"	0
Total area eliminated	0

8. Acquisition Approach

The project delivery method will be Design-Build (DB) in which a single subcontractor will complete both the final design and construction of the facility under a single contract. The Naval Reactors prime contractor will administer the contract.

22-D-531, KL Chemistry Laboratory and Radiological Health
Knolls Atomic Power Laboratory, Niskayuna, NY
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The Fiscal Year (FY) 2024 Request for 22-D-531, KL Chemistry and Radiological Health is $10,400,000 of Total Estimated Cost (TEC) funding, an increase over the $41,620,000 appropriated in FY 2022, to bring the TEC to $52,020,000. The project baseline was approved at Critical Decision (CD) CD-1/2 on April 27, 2020, with a CD-4 of 1Q FY 2025 and a total project cost (TPC) of $45,870,000. On January 5th, 2023, the project baseline was updated with a new TPC of $56,270,000 and CD-4 of 1Q FY 2026 reflecting the $10,400,000 increase to the TPC.

A Federal Project Manager (FPM) has been assigned to this project.

Significant Changes

This Construction Project Data Sheet (CPDS) is an update to reflect an updated project baseline, TPC and CD-4 for the project due to increased escalation for construction labor and materials since the FY 2022 budget submission. The schedule delay is based on efforts to negotiate achieving the KPPs within the original budget. Removing unnecessary features and renegotiating contractor proposals resulted in a 1-year delay.

Critical Milestone History

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2022	2/13/2017	1/31/2020	4/27/2020	4/27/2020	1Q FY 2023	3Q FY 2021	N/A	1Q FY 2025
FY 2024	2/13/2017	1/31/2020	4/27/2020	4/27/2020	1Q FY 2024	3/16/2021	N/A	1Q FY 2026

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete/d
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work (see Section 7)
CD-4 – Approve Start of Operations or Project Completion

Project Cost History

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC Except D&D	OPC, D&D	OPC, Total	TPC
FY 2022	2,850	38,770	41,620	4,250	0	4,250	45,870
FY 2024	2,850	49,170	52,020	4,250	0	4,250	56,270

2. Project Scope and Justification

Scope

This project will design and construct a state-of-the-art multi-story, approximately 45,000 square foot building to house Physical Chemistry, Analytical Chemistry, and Radiochemistry operations as well as Radiation Health consisting of Internal and External Dosimetry and RADIAC calibration. The building will also provide professional office space for approximately 60 personnel who will work in the facility. The facility will provide laboratory-type areas to support chemistry operations, adequate storage space, standard building services, accommodations for a 77,000-pound Low Energy Lung Monitor (LELM) whole body counting equipment, radioactive source storage including shielding, and space for the RADIAC calibration source range. The facility will meet the requirements for vibration sensitive equipment, include independent ventilation systems for laboratory environmental control and radiological operations, and provide radiological facility design features that conform to all applicable government radiological controls requirements.

Justification

Current facilities that serve the Chemistry Laboratories and Radiation Health organizations are deteriorating and require replacement to maintain an environment that supports laboratory operations and satisfactory working conditions for personnel. The existing facilities contain legacy contamination, which makes maintenance and repair efforts lengthy and complex. Deteriorating infrastructure poses a risk to high-value equipment, as inability to effectively control ventilation and temperature affects routine work processes. In addition, general office conditions are inadequate for personnel and fire protection systems are incomplete and do not meet current standards.

The previously appropriated $41,620,000 TEC is insufficient to deliver the threshold KPPs of the project due to increased escalation for construction labor and materials since the FY 2022 budget submission. The project requires an additional $10,400,000 to construct the Radiochemistry laboratory. The current state of the Radiochemistry laboratory presents the same challenges as discussed previously with aging facilities and legacy radiological and environmental liabilities. The Radiochemistry mission is required to support the Naval Reactors Program for the foreseeable future. If the $10,400,000 additional appropriations are not approved for FY 2024, the Radiochemistry scope will be removed from this project, and substantial investment will be required to support mission essential work in the current Radiochemistry laboratory until a new laboratory can be built as part of another project. Additionally, constructing a new, standalone Radiochemistry laboratory is expected to be more substantially more expensive.

Key Performance Parameters (KPPs)

The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The KPPs were finalized with CD-2 approval.

Performance Measure	Threshold	Objective
Building Size - Usable Square Feet (USF)	Provide 23,000 USF of laboratory space and general occupancy space	Provide 25,000 USF of laboratory space and general occupancy space
Occupancy	Provide office space for 60 personnel	Provide office space for 60 personnel
Stability - temperature, humidity, vibration isolation, and acoustic attenuation	Meet the minimum requirements outlined in the Project Program and by the manufacturers of the laboratory equipment	Meet the minimum requirements outlined in the Project Program and by the manufacturers of the laboratory equipment
Compliance with radiological controls requirements	Meet all applicable government radiological controls requirements	Meet all applicable government radiological controls requirements
Sustainability	Achieve 30% or greater efficiency over ASHRAE 90.1-2016	Achieve 30% or greater efficiency over ASHRAE 90.1-2016

3. Financial Schedule

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Total Estimated Cost (TEC)			
Design			
FY 2022	2,850	0	0
FY 2023	0	2,700	1,700
FY 2024	0	150	900
FY 2025	0	0	250
Total Design	**2,850**	**2,850**	**2,850**
Construction			
FY 2022	38,770	0	0
FY 2023	0	33,891	8,927
FY 2024	10,400	12,089	21,984
FY 2025	0	2,391	17,184
FY 2026	0	799	1,075
Total Construction	**49,170**	**49,170**	**49,170**
TEC			
FY 2022	41,620	0	0
FY 2023	0	36,591	10,627
FY 2024	10,400	12,189	22,884
FY 2025	0	2,441	17,434
FY 2026	0	799	1,075
Total TEC	**52,020**	**52,020**	**52,020**

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
Other Project Costs (OPC)			
FY 2019 and earlier	668	668	512
FY 2020	185	185	315
FY 2021	210	210	236
FY 2022	128	128	128
FY 2023	994	994	650
FY 2024	2,001	2,001	1,638
FY 2025	64	64	769
FY 2026	0	0	2
Total, OPC	**4,250**	**4,250**	**4,250**
Total Project Costs (TPC)			
FY 2019 and earlier	668	668	512
FY 2020	185	185	315
FY 2021	210	210	236
FY 2022	41,748	128	128
FY 2023	994	37,585	11,277
FY 2024	12,401	14,190	24,522
FY 2025	64	2,505	18,203
FY 2026	0	799	1,077
Total TPC	**56,270**	**56,270**	**56,270**

4. Details of Project Cost Estimate

		($K)	
	Current Total Estimate	**Previous Total Estimate**	**Previous Validated Baseline**
Total Estimated Cost (TEC)			
Design			
Design	2,850	2,850	2,850
Contingency	0	0	0
Total Design	**0**	**0**	**0**
Construction			
Equipment	0	0	0
Construction	45,757	35,575	35,575
Contingency	3,413	3,195	3,195
Total Construction	**52,020**	**41,620**	**41,620**
Total Estimated Cost (TEC)	**52,020**	**41,620**	**41,620**
Contingency, TEC	*3,413*	*3,195*	*3,195*
Other Project Costs (OPC)			
OPC except D&D			
OPC	4,250	4,250	4,250
Contingency	0	0	0
Total OPC	**4,250**	**4,250**	**4,250**
Contingency, OPC	*0*	*0*	*0*
Total Project Cost	**56,270**	**45,870**	**45,870**
Total Contingency (TEC+OPC)	***3,413***	***3,195***	***3,195***

5. Schedule of Appropriation Requests

($K)

Request Year	Type	Prior Years	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2022	TEC	0	41,620	0	0	0	0	0	0	0	41,620
	OPC	1,023	940	1,244	1,043	0	0	0	0	0	4,250
	TPC	1,023	42,560	1,244	1,293	0	0	0	0	0	45,870
FY 2024	TEC	0	41,620	0	10,400	0	0	0	0	0	52,020
	OPC	1,063	128	994	2,001	64	0	0	0	0	4,250
	TPC	1,063	41,748	994	12,401	64	0	0	0	0	56,270

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	1Q FY 2026
Expected Useful Life	40 years
Expected Future Start of D&D of this capital asset	1Q FY 2066

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	0.751	0.751	17.36	17.36
D&D	N/A	N/A	$2.741	$9.548
TOTAL	0.751	0.751	20.101	26.908

7. D&D Information

The new facility will be constructed on available land. The facilities that are being replaced will undergo D&D under other initiatives and those costs are not included in the costs of this construction project.

	Square Feet
New area being constructed by this project at Knolls	45,000
Area of D&D in this project at Knolls	0
Area at Knolls to be transferred, sold, and/or D&D outside the project including area previously "banked"	16,460
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project including area previously "banked"	29,540
Total area eliminated	45,000

8. Acquisition Approach

The procurement strategy for this project is Design-Build. All contracts will be negotiated procurements and the basis of the award will be a determination of best value through a formalized selection process.

21-D-530, KL Steam and Condensate Upgrade
Knolls Atomic Power Laboratory, Niskayuna, NY
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary
The FY 2024 Request for 21-D-530, KL Steam and Condensate Upgrade is $53,000,000 of Total Estimated Cost (TEC) funding. The project baseline was approved at Critical Decision (CD) CD-2 on May 5, 2022, with a total project cost (TPC) of $63,500,000 and a CD-4 in 2Q FY 2029.

A Federal Project Director (FPD) has been assigned to this project.

Significant Changes
The project baseline was approved on May 5, 2022. The period of performance of the project was extended three years to accommodate system interferences, such as penetrations associated with tying-in existing buildings with the new system, identified during the detailed design and to establish discrete phases of work to ensure continuity of operations of the steam and condensate system each winter. The additional scope and schedule resulted in a $10 million TPC increase from the previously reported TPC.

Critical Milestone History[a]

Fiscal Quarter or Date

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2021	8/2/2018	01/31/2020	2Q FY 2020	3Q FY 2022	3Q FY 2023	4Q FY 2023	N/A	1Q FY 2026
FY 2024	8/2/2018	01/31/2020	3/17/2020	5/5/2022	3Q FY 2023	4Q FY 2023	N/A	2Q FY 2029

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternative Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Estimated/Actual date the project design will be/was complete/d
CD-3 – Approve Start of Construction/Execution
D&D Complete –Completion of D&D work (see Section 9)
CD-4 – Approve Start of Operations or Project Completion

Project Cost History[a]

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC Except D&D	OPC, D&D	OPC, Total	TPC
FY 2021	4,000	46,200	50,200	3,170	0	3,170	53,370
FY 2024	4,000	53,000	57,000	6,500	0	6,500	63,500

[a] No funding requested in FY 2022 and FY 2023 and did not require a CPDS.

2. Project Scope and Justification

Scope

This project replaces and upgrades major portions of the Knolls Laboratory site steam and condensate system, including steam and condensate piping, stanchions, condensate pumps, and pressure reducing stations. This project will optimize the steam and condensate system to support current and future facilities, ensure all portions of the system are accessible for maintenance and repairs, and will support partial isolations to maintain steam and condensate service, to the maximum extent possible, while performing maintenance.

Justification

The Knolls Laboratory requires reliable steam and condensate to support the Naval Nuclear Propulsion Program. Steam is used to provide heat to all buildings during the winter months and is essential for personnel comfort, maintaining specific climate conditions for testing equipment, and preventing freezing and rupture of water piping. A water pipe rupture can impair life and safety systems, significantly damage equipment, and/or jeopardize test programs. A significant portion of steam and condensate system is original to the site (i.e., over 65 years old), beyond its useful service life, and has experienced several recent failures. Portions of the steam and condensate system are not accessible, such as the main steam header feeding the west side which is currently located in a tunnel with minimal access. Should a major failure occur, it would result in heat loss to the majority of the Knolls Laboratory.

Key Performance Parameters (KPPs)

Performance Measure	Threshold	Objective
1. Provide high-pressure steam from the lower-level branch tee to service points at the upper level.	Replace 90% of the hillside and upper level steam and condensate system.	Replace 100% of the hillside and upper level steam and condensate system
2. Provide a valve configuration that allows the isolation of branch lines for maintenance and repair activities.	90% of the new steam and condensate branch lines are equipped with isolation valves.	100% of the new steam and condensate branch lines are equipped with isolation valves
3. Provide a system configuration that is accessible for conventional maintenance and repair activities.	90% of the new steam and condensate system is conventionally accessible.	100% of the new steam and condensate system is conventionally accessible.
4. Provide a means for personnel, material, and vehicles up to 25 tons to traverse between the upper and lower levels of the site within the secured perimeter.	Provide a single lane, yield road.	Provide a two-lane road.

3. Financial Schedule

($K)

		Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)				
Design				
	FY 2021	4,000	1,662	423
	FY 2022	0	602	1,187
	FY 2023	0	550	1,204
	FY 2024	0	300	300
	FY 2025	0	300	300
	FY 2026	0	275	275
	FY 2027	0	225	225
	FY 2028	0	86	86
Total Design		**4,000**	**4,000**	**4,000**
Construction				
	FY 2024	53,000	38,600	11,532
	FY 2025	0	4,911	14,225
	FY 2026	0	3,805	14,250
	FY 2027	0	1,930	8,525
	FY 2028	0	3,754	4,468
Total Construction		**53,000**	**53,000**	**53,000**
TEC				
	FY 2021	4,000	1,662	423
	FY 2022	0	602	1,187
	FY 2023	0	550	1,204
	FY 2024	53,000	38,900	11,832
	FY 2025	0	5,211	14,525
	FY 2026	0	4,080	14,525
	FY 2027	0	2,155	8,750
	FY 2028	0	3,840	4,554
Total TEC		**57,000**	**57,000**	**57,000**
Other Project Costs (OPC)				
	FY 2018	48	48	38
	FY 2019	336	336	208
	FY 2020	86	86	175
	FY 2021	333	333	380
	FY 2022	305	305	307
	FY 2023	495	495	495
	FY 2024	3,542	3,542	1,500
	FY 2025	505	505	1,500
	FY 2026	460	460	1,000
	FY 2027	283	283	750
	FY 2028	107	107	147

	($K)		
	Budget Authority (Appropriations)	**Obligations**	**Costs**
‘Total, OPC	**6,500**	**6,500**	**6,500**
Total Project Costs (TPC)			
FY 2018	48	48	38
FY 2019	336	336	208
FY 2020	86	86	175
FY 2021	4,333	1,995	803
FY 2022	305	907	1,494
FY 2023	495	1,045	1,699
FY 2024	56,542	42,442	13,332
FY 2025	505	5,716	16,025
FY 2026	460	4,540	15,525
FY 2027	283	2,438	9,500
FY 2028	107	3,947	4,701
Total TPC	**63,500**	**63,500**	**63,500**

4. Details of Project Cost Estimate ($K)

		($K)		
		Current Total Estimate	Previous Total Estimate	Previous Validated Baseline
Total Estimated Cost (TEC)				
Design				
	Design	3,600	3,600	N/A
	Contingency	400	400	N/A
Total Design		**4,000**	**4,000**	**N/A**
Construction				
	Construction	45,000	42,000	N/A
	Site Preparation	0	0	N/A
	Equipment	0	0	N/A
	Contingency	8,000	4,200	N/A
Total Construction		**53,000**	**46,200**	**N/A**
Total Estimated Cost (TEC)		**57,000**	**50,200**	**N/A**
Contingency, TEC		*8,400*	*4,600*	*N/A*
Other Project Costs (OPC)				
OPC except D&D				
	OPC	5,500	3,170	N/A
	Contingency	1,000	0	N/A
Total OPC		**6,500**	**3,170**	**N/A**
Contingency, OPC		*1,000*	*0*	*N/A*
Total Project Cost		**63,500**	**53,370**	**N/A**
Total Contingency (TEC+OPC)		***9,400***	***4,600***	***N/A***

5. Schedule of Appropriation Requests[a]

Request Year	Type	Prior Years	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Out Years	Total
FY 2021	TEC	4,000	0	46,200	0	0	0	0	0	50,200
	OPC	1,130	1,050	160	160	160	160	0	0	2,820
	TPC	5,130	1,050	46,360	160	160	160	0	0	53,020
FY 2024	TEC	4,000	0	53,000	0	0	0	0	0	57,000
	OPC	1,108	495	3,542	505	460	283	107	0	6,500
	TPC	5,108	495	56,542	505	460	283	107	0	63,500

[a] No funding requested in FY 2022 and FY 2023 and did not require a CPDS.

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	4Q FY 2028
Expected Useful Life	50 years
Expected Future Start of D&D of this capital asset	4Q FY 2078

Related Funding Requirements
(Budget Authority in Millions of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	1.3	0.232	51.6	3.992

7. D&D Information

There is no new area being constructed in this construction project.

8. Acquisition Approach

The procurement strategy being evaluated for this project is Design-Bid-Build. All contracts will be negotiated procurements, and the basis of the award will be a determination of best value through a formalized selection process.

14-D-901, Spent Fuel Handling Recapitalization Project
Naval Reactors Facility, Idaho
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2024 Request for 14-D-901, Spent Fuel Handling Recapitalization Project is $199,300,000 of Total Project Cost (TPC) funding. The FY 2024 Budget Request of $199,300,000 will enable the project to continue permanent construction activities such as erection of the structural steel, placement of the water pool concrete, and procurement/installation of the utility systems. Critical Decision (CD)-2/3, Performance Baseline and Start of Permanent Construction, was approved on September 24, 2018 with a TPC of $1,686,500,000 and a CD-4 of 3Q FY 2025. On October 31, 2019, a revision to the Performance Baseline was approved with a TPC of $2,060,000,000 and a CD-4 date of 3Q FY 2026. On July 13, 2021, a second revision to the Performance Baseline was approved with a TPC of $2,333,000,000 and a CD-4 date of 3Q FY 2026. On October 20, 2022, a third revision to the Performance Baseline was approved with a TPC of $3,000,000,000 and a CD-4 date of 4Q FY 2028.

Significant Changes

This CPDS is an update of the FY 2023 CPDS and does not include a new start for the budget year.

The impacts from delays due to poor subcontractor performance, actions to mitigate these delays, and significant market volatility, including projections for increased escalation for construction labor and materials, have resulted in a Project delay and cost increase. The Performance Baseline revision approved by Naval Reactors in FY 2021 accounted for the initial cost impacts due to the pandemic and actions to recover from the unexpected variability in the bedrock surface that complicated early performance of a major construction subcontractor. This Performance Baseline revision relied upon a recovery schedule that has since not been met by a major construction subcontractor due to poor performance. Naval Reactors has taken actions to minimize the impacts of the performance issues on the Project's cost and schedule including re-planning the acquisition approach for the remaining Project scope. These actions, combined with significant market volatility leading to projections for increased escalation for construction labor and materials and further refinement of the schedule, resulted in approximately a two-year delay to the Project and a TPC of $3,000,000,000. Naval Reactors adjudicated updates to the TPC and Project Completion milestones in a Performance Baseline revision on October 20, 2022.

Critical Milestone History

(Fiscal Quarter or Date)

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2014	03/29/2008		1Q FY 2014	3Q FY 2015	4Q FY 2016	4Q FY 2016	N/A[a]	4Q FY 2022
FY 2015	03/29/2008		1Q FY 2014	3Q FY 2015	4Q FY 2016	4Q FY 2016	N/A	4Q FY 2022
FY 2015 Rev[b]	03/29/2008		1Q FY 2015	3Q FY 2017	4Q FY 2018	1Q FY 2018	N/A	4Q FY 2024
FY 2016[c]	03/29/2008		2Q FY 2015	1Q FY 2018	4Q FY 2019	4Q FY 2018	N/A	3Q FY 2025
FY 2017	03/29/2008	03/19/2015	03/19/2015	1Q FY 2018	3Q FY 2020[d]	4Q FY 2018	N/A	3Q FY 2025
FY 2018	03/29/2008	03/19/2015	03/19/2015	4Q FY 2018[e]	3Q FY 2020	4Q FY 2018	N/A	3Q FY 2025
FY 2019	03/29/2008	03/19/2015	03/19/2015	4Q FY 2018	3Q FY 2020	4Q FY 2018	N/A	3Q FY 2025
FY 2020	03/29/2008	03/19/2015	03/19/2015	09/24/2018	3Q FY 2020	09/24/2018	N/A	3Q FY 2025

[a] D&D is not within the scope of this project.
[b] The FY 2015 Revision incorporated the expected impacts of the Consolidated Appropriations Act, 2014 funding reductions.
[c] The FY 2016 CPDS incorporated the impacts from the FY 2015 delayed appropriation.
[d] The FY 2017 CPDS incorporated a phased design.
[e] The FY 2018 CPDS revised the CD-2 milestone date to be consistent with revisions to DOE Order 413.3.

(Fiscal Quarter or Date)

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	D&D Complete	CD-4
FY 2021[a]	03/29/2008	03/19/2015	03/19/2015	09/24/2018	2Q FY 2021	09/24/2018	N/A	3Q FY 2026
FY 2022	03/29/2008	03/19/2015	03/19/2015	09/24/2018	03/04/2021	09/24/2018	N/A	3Q FY 2026
FY 2023	03/29/2008	03/19/2015	03/19/2015	09/24/2018	03/04/2021	09/24/2018	N/A	3Q FY 2026
FY 2024[b]	03/29/2008	03/19/2015	03/19/2015	09/24/2018	03/04/2021	09/24/2018	N/A	4Q FY 2028

CD-0 – Approve Mission Need
Conceptual Design Complete – Actual date the conceptual design was completed
CD-1 – Approve Alternate Selection and Cost Range
CD-2 – Approve Performance Baseline
Final Design Complete – Actual date the facility design was completed
CD-3 – Approve Start of Construction/Execution
D&D Complete – Completion of D&D work (see Section 5)
CD-4 – Approve Start of Operations or Project Completion

(Fiscal Quarter or Date)

Fiscal Year	CD-3A	CD-3B	CD-4A
FY 2017	2Q FY 2017	1Q FY 2018	3Q FY 2024
FY 2018	12/7/2016	4Q FY 2017	3Q FY 2024
FY 2019	12/7/2016	6/14/2017	3Q FY 2024
FY 2020	12/7/2016	6/14/2017	3Q FY 2024
FY 2021[c]	12/7/2016	6/14/2017	3Q FY 2025
FY 2022	12/7/2016	6/14/2017	3Q FY 2025
FY 2023	12/7/2016	6/14/2017	3Q FY 2025
FY 2024[d]	12/7/2016	6/14/2017	2Q FY 2027

CD-3A – Start of Long Lead Material Procurement
CD-3B – Start of Early Site Preparation
CD-4A – Start of M-290 Shipping Container Unloading Operations

Project Cost History

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2014	369,400	917,100	1,286,500	165,000	N/A	165,000	1,451,500
FY 2015	369,400	917,100	1,286,500	165,000	N/A	165,000	1,451,500
FY 2015 Rev[e]	263,000	1,144,900	1,407,000	178,200	N/A	178,200	1,586,100
FY 2016[f]	268,800	1,182,100	1,450,900	195,600	N/A	195,600	1,646,500
FY 2017[g]	239,800	1,232,600	1,472,400	174,100	N/A	174,100	1,646,500
FY 2018	239,800	1,232,600	1,472,400	174,100	N/A	174,100	1,646,500

[a] The FY 2021 CPDS revised the dates for final design complete, CD-4A, and CD-4 to reflect the October 2019 Performance Baseline Revision.
[b] The FY 2024 CPDS revised the CD-4 milestone to reflect the October 2022 Performance Baseline Revision.
[c] The FY 2021 CPDS revised the CD-4A milestone to reflect the October 2019 Performance Baseline Revision.
[d] The FY 2024 CPDS revised the CD-4A milestone to reflect the October 2022 Performance Baseline Revision.
[e] The FY 2015 Revision incorporated the expected impacts of the Consolidated Appropriations Act, 2014 funding reductions.
[f] The FY 2016 CPDS incorporated the impacts from the FY 2015 delayed appropriation.
[g] Divisions between cost categories were updated based on progression of the Project designs and CD-1 completion.

($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, D&D	OPC, Total	TPC
FY 2019[a]	306,982	1,165,418	1,472,400	174,100	N/A	174,100	1,646,500
FY 2020[b]	302,489	1,169,911	1,472,400	174,100	N/A	174,100	1,686,500[c]
FY 2021[d]	278,860	1,607,140	1,886,000	174,000	N/A	174,000	2,060,000
FY 2022	276,896	1,609,104	1,886,000	174,000	N/A	174,000	2,060,000
FY 2023[e]	332,288	1,826,712	2,159,000	174,000	N/A	174,000	2,333,000
FY 2024[f]	332,288	2,491,339	2,823,627	176,373	N/A	176,373	3,000,000

2. Project Scope and Justification

Scope

The Spent Fuel Handling Recapitalization Project will design and construct a new facility, the Naval Spent Fuel Handling Facility, to incorporate the capabilities for naval spent nuclear fuel handling that currently exist in the Expended Core Facility and its support facilities. Additionally, a major portion of this new facility is required to support additional capability, which does not exist in the Expended Core Facility, to handle full-length aircraft carrier naval spent nuclear fuel received in M-290 shipping containers. The Naval Spent Fuel Handling Facility footprint will be approximately 213,000 square feet. Of this, approximately 121,000 square feet is required for spent fuel shipping container and dry storage operations, which includes approximately 17,000 square feet for water pool spent fuel preparation and in-process storage. The remainder of the facility, approximately 92,000 square feet, is required for waste management, facility systems operations, staging, and administrative office space. The Spent Fuel Handling Recapitalization Project has completed final design and site preparation and is in the construction phase.

The following represents the general scope of the Spent Fuel Handling Recapitalization Project:

- Design and construct a facility and facility systems for naval spent nuclear fuel handling, including the capability to receive, unload, prepare, and package naval spent nuclear fuel.
- Design and construct infrastructure needed to support naval spent nuclear fuel handling operations.
- Design and procure equipment to make the facility ready for use to receive, unload, prepare, and package naval spent nuclear fuel, where appropriate.
- Provide the new capability to unload M-290 spent fuel shipping containers.
- Prepare testing, operating, and preventive maintenance procedures and drawings, where appropriate, for the naval spent nuclear fuel handling process systems, equipment, facilities, and facility systems.
- Develop training programs and conduct personnel training, where appropriate.
- Develop project management procedures and manage Project activities.
- Provide support services needed for the Project.
- Manage subcontracts supporting the design and construction.
- Prepare an Environmental Impact Statement in accordance with the National Environmental Policy Act.

Justification

The mission of Naval Reactors is to provide the Nation with militarily effective nuclear propulsion plants and to ensure their safe, reliable, long-lived, and affordable operation. Naval Reactors maintains total responsibility for all aspects of the U.S. Navy's nuclear propulsion systems, including research, design, construction, testing, operation, maintenance, and disposal.

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[a] Divisions between cost categories were updated to account for the phased design.
[b] Divisions between cost categories were updated based on establishment of the Performance Baseline in September 2018.
[c] The total amount of the entries in this row is $1,646,500, but the total is stated as $1,686,500 to reflect the TPC that was established with the CD-2/3 Performance Baseline. The additional $40 million was first reflected in the FY 2021 CPDS.
[d] The FY 2021 CPDS revised the TEC, OPC, and TPC to reflect the October 2019 Performance Baseline Revision and included the $40 million funding requirement from the initial Performance Baseline that was not reflected in the FY 2020 CPDS.
[e] The FY 2023 CPDS revised the TEC, OPC, and TPC to reflect the July 2021 Performance Baseline Revision.
[f] The FY 2024 CPDS revised the TEC, OPC, and TPC to reflect the October 2022 Performance Baseline Revision.

At the end of reactor service life, Naval Reactors transports naval spent nuclear fuel from its origin (e.g., servicing shipyards and naval training platforms) to the Naval Reactors Facility at the Idaho National Laboratory.

The Expended Core Facility, located at the Naval Reactors Facility in Idaho, is the only facility with the capabilities to receive naval spent nuclear fuel shipping containers and process naval spent nuclear fuel. Although the existing Expended Core Facility continues to be maintained and operated in a safe and environmentally responsible manner, the infrastructure is over 60 years old, does not meet current standards (i.e., requirements that were not applicable at the time of construction), and requires recapitalization. The Expended Core Facility is also incapable of receiving full-length aircraft carrier naval spent nuclear fuel, which is required to support aircraft carrier refuelings. The magnitude of required sustainment efforts and incremental infrastructure upgrades within the Expended Core Facility pose substantial risk to the continued preparation of naval spent nuclear fuel for long term storage. Specifically, sustainment efforts could require delays to naval spent nuclear fuel shipping container unloading operations, which would interrupt refueling and defueling schedules for nuclear-powered vessels and would adversely affect the operational availability of the nuclear fleet. If this interruption were to extend over long periods of time, the ability to sustain fleet operations would be impacted, resulting ultimately in a significant decrement to the Navy's responsiveness and agility to fulfill military missions worldwide.

The existing Expended Core Facility at the Naval Reactors Facility in Idaho is a single facility that is approximately 197,000 square feet. However, other facilities at the Naval Reactors Facility support operations within the Expended Core Facility and include additional areas for administrative support and warehouse storage. The Expended Core Facility has two major capabilities: (1) to receive, unload, prepare, and package naval spent nuclear fuel, and (2) to conduct examinations of naval spent nuclear fuel and irradiation test specimens from the Advanced Test Reactor.

Actions necessary to continue Naval Reactors’ ability to support naval spent nuclear fuel handling were the subject of an Environmental Impact Statement. The Final Environmental Impact Statement for recapitalization of the infrastructure supporting naval spent nuclear fuel was published on September 30, 2016 and included an assessment of the environmental impacts associated with handling of naval spent nuclear fuel for the following alternatives:

(1) No Action Alternative – Maintain the naval spent nuclear fuel handling capabilities of the existing Expended Core Facility by continuing to use the existing infrastructure while performing corrective maintenance and repairs.
(2) Overhaul Alternative – Recapitalize the naval spent nuclear fuel handling capabilities of the Expended Core Facility by overhauling the existing facility with major refurbishment projects for the infrastructure and water pools.
(3) New Facility Alternative, including the Spent Fuel Handling Recapitalization Project – Recapitalize the naval spent nuclear fuel handling capabilities of the Expended Core Facility by constructing and operating a new facility at one of two potential locations at the Naval Reactors Facility in Idaho.

The National Environmental Policy Act Record of Decision, which identified the New Facility Alternative as the preferred method to recapitalize the naval spent nuclear fuel handling capabilities of the Expended Core Facility, was published on December 5, 2016.

Naval Reactors has an equivalency to the project management requirements in DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*. The Project is being conducted in accordance with the Naval Reactors Implementation Bulletin for DOE O 413.3, and appropriate project management requirements have been met.

Prior to CD-2/3 approval, an independent cost estimate was completed by the Department of Defense Office of Cost Assessment and Program Evaluation.

Key Performance Parameters (KPPs)

The Threshold KPPs represent the minimum acceptable performance that the project must achieve. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion. The KPPs were formally established as part of the Performance Baseline and approval of CD-2/3.

Performance Measure	Threshold	Objective
Provide the facility (infrastructure) to receive, unload, prepare, and package full-length aircraft carrier and submarine naval spent nuclear fuel.	An approximately 185,000 square foot facility, which includes an approximate 15,000 square foot water pool.	An approximately 245,000 square foot facility, which includes an approximate 20,000 square foot water pool.
Provide equipment to receive and unload naval spent nuclear fuel.	Receive and unload 7 M-290 shipping containers per year.	Receive and unload 9 M-290 and 12 M-140 shipping containers per year.
Provide equipment to initially inspect and prepare naval spent nuclear fuel for ultimate disposal.	Initially inspect and prepare 62 full-length NIMITZ Class aircraft carrier spent nuclear fuel modules per year.	Initially inspect and prepare 96 full-length aircraft carrier and 64 submarine spent nuclear fuel modules per year.
Provide equipment to package naval spent nuclear fuel into canisters for dry storage.	Package 6 naval spent fuel canisters per year.	Package 10 naval spent fuel canisters per year.
Provide equipment to temporarily store naval spent nuclear fuel in the water pool.	Storage for 126 full-length NIMITZ Class aircraft carrier spent nuclear fuel modules.	Storage for 408 aircraft carrier and submarine spent nuclear fuel modules.
Provide equipment to manage remote-handled low-level waste generated from receiving, unloading, preparing, and packaging spent nuclear fuel.	Package and ship 9 remote-handled low level waste canisters per year.	Package and ship 20 remote-handled low level waste canisters per year.

3. Financial Schedule

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs[a]
Total Estimated Cost (TEC)	[b]	[b]	[c]
Design			
FY 2015	N/A	N/A	19,542
FY 2016	N/A	N/A	56,846
FY 2017	N/A	N/A	65,964
FY 2018	N/A	N/A	78,704
FY 2019	N/A	N/A	62,026
FY 2020	N/A	N/A	32,263
FY 2021	N/A	N/A	16,943
Total, Design	N/A	N/A	332,288
Construction			
FY 2017	N/A	N/A	1,867
FY 2018	N/A	N/A	11,530
FY 2019	N/A	N/A	66,979
FY 2020	N/A	N/A	138,986
FY 2021	N/A	N/A	242,454
FY 2022	N/A	N/A	178,347
FY 2023	N/A	N/A	511,394
FY 2024	N/A	N/A	622,812
FY 2025	N/A	N/A	422,671
FY 2026	N/A	N/A	229,464
FY 2027	N/A	N/A	59,020
FY 2028	N/A	N/A	5,815
FY 2029	N/A	N/A	-
Total Construction	N/A	N/A	2,491,339
TEC			
FY 2015	N/A	N/A	19,542
FY 2016	N/A	N/A	56,846
FY 2017	N/A	N/A	67,831
FY 2018	N/A	N/A	90,234
FY 2019	N/A	N/A	129,005
FY 2020	N/A	N/A	171,249
FY 2021	N/A	N/A	259,397
FY 2022	N/A	N/A	178,347
FY 2023	N/A	N/A	511,394
FY 2024	N/A	N/A	622,812
FY 2025	N/A	N/A	422,671
FY 2026	N/A	N/A	229,464
FY 2027	N/A	N/A	59,020

[a] Totals may not add due to rounding.
[b] Due to the Consolidated and Further Continuing Appropriations Act, 2015, the TEC and OPC appropriations/obligations for FY 2015 and beyond are combined into the TPC appropriations/obligations.
[c] The FY 2024 CPDS revised the TEC, OPC, and TPC to reflect the October 2022 Performance Baseline Revision.

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs[a]
FY 2028	N/A	N/A	5,815
FY 2029	N/A	N/A	-
Total, TEC	N/A	N/A	2,823,627
Other Project Cost (OPC)			
FY 2010	6,600	6,600	6,372
FY 2011	36,100	36,100	31,168
FY 2012	25,200	25,200	29,420
FY 2013	29,000	29,000	27,172
FY 2014	25,400	25,400	28,017
FY 2015	N/A	N/A	8,514
FY 2016	N/A	N/A	1,567
FY 2017	N/A	N/A	1,990
FY 2018	N/A	N/A	3,448
FY 2019	N/A	N/A	2,658
FY 2020	N/A	N/A	3,616
FY 2021	N/A	N/A	2,949
FY 2022	N/A	N/A	2,024
FY 2023	N/A	N/A	4,203
FY 2024	N/A	N/A	3,410
FY 2025	N/A	N/A	7,197
FY 2026	N/A	N/A	6,411
FY 2027	N/A	N/A	3,696
FY 2028	N/A	N/A	603
FY 2029	N/A	N/A	1,938
Total, OPC	N/A	N/A	176,373
Total Project Cost (TPC)			
FY 2010	6,600	6,600	6,372
FY 2011	36,100	36,100	31,168
FY 2012	25,200	25,200	29,420
FY 2013	29,000	29,000	27,172
FY 2014	25,400	25,400	28,017
FY 2015	70,000	70,000	28,056
FY 2016	86,000	86,000	58,413
FY 2017	100,000	100,000	69,821
FY 2018	197,000	197,000	93,682
FY 2019	287,000	287,000	131,663
FY 2020	238,000	238,000	174,865
FY 2021	330,000	330,000	262,346
FY 2022	400,000	400,000	180,371
FY 2023	476,798	476,798	515,597
FY 2024	199,300	199,300	626,222
FY 2025	292,002	292,002	429,869

	($K)		
	Budget Authority (Appropriations)	Obligations	Costs[a]
FY 2026	176,000	176,000	235,874
FY 2027	25,600	25,600	62,715
FY 2028	0	0	6,418
FY 2029	0	0	1,938
Grand Total	**3,000,000**	**3,000,000**	**3,000,000**

4. Details of Project Cost Estimate

	($K)		
	Current Total Estimate[ab]	Previous Total Estimate[c]	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	332,288	332,288	300,789
Contingency	0	0	1,700
Total, Design	332,288	332,288	302,489
Construction			
Long Lead Material and Site Preparation	57,010	57,010	41,148
Spent Fuel Handling Equipment	258,852	224,354	215,454
Facility Construction	1,878,326	1,346,500	845,841
Contingency	297,150	198,848	107,468
Total, Construction	2,491,339	1,826,712	1,209,911
Total Estimated Cost	2,823,627	2,159,000	1,512,400
Contingency, TEC	297,150	198,848	109,168
Other Project Cost (OPC)			
Conceptual Planning	37,540	37,540	37,540
Conceptual Design	99,427	99,427	99,427
Start-up	19,561	20,852	26,273
Other (e.g., EIS, Project Reviews)	14,845	12,029	7,301
Contingency	5,000	4,152	3,559
Total, OPC	176,373	174,000	174,100
Contingency, OPC	5,000	4,152	3,559
Total Project Cost	3,000,000	2,333,000	1,686,500
Total, Contingency (TEC+OPC)	302,150	203,000	112,727

[a] The FY 2024 CPDS revised the TEC, OPC, and TPC to reflect the October 2022 Performance Baseline Revision.
[b] Totals may not add due to rounding.
[c] Previous Total Estimate is from the FY 2023 CPDS.

5. Schedule of Appropriation Requests

($K)

Request Year	Type	Prior Years	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
FY 2014	TEC	1,286,500	0	0	0	0	0	0	1,286,500
	OPC	165,000	0	0	0	0	0	0	165,000
	TPC	1,451,500	0	0	0	0	0	0	1,451,500
FY 2015	TEC	1,286,500	0	0	0	0	0	0	1,286,500
	OPC	165,000	0	0	0	0	0	0	165,000
	TPC	1,451,500	0	0	0	0	0	0	1,451,500
FY 2015 Rev	TEC	1,355,000	33,200	19,700	0	0	0	0	1,407,900
	OPC	157,100	7,900	9,600	3,600	0	0	0	178,200
	TPC	1,512,100	41,100	29,300	3,600	0	0	0	1,586,100
FY 2016	TEC	1,351,900	54,800	24,500	19,700	0	0	0	1,450,900
	OPC	165,600	7,200	8,500	10,300	4,000	0	0	195,600
	TPC	1,517,500	62,000	33,000	30,000	4,000	0	0	1,646,500
FY 2017	TEC	1,362,200	57,300	29,300	23,600	0	0	0	1,472,400
	OPC	156,100	4,400	3,600	6,200	3,800	0	0	174,100
	TPC	1,518,300	61,700	32,900	29,800	3,800	0	0	1,646,500
FY 2018	TEC	1,376,200	43,300	29,300	23,600	0	0	0	1,472,400
	OPC	156,100	4,400	3,600	6,200	3,800	0	0	174,100
	TPC	1,532,300	47,700	32,900	29,800	3,800	0	0	1,646,500
FY 2019[a]	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,472,400
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	174,100
	TPC	1,532,300	47,700	32,900	29,800	3,800	0	0	1,646,500
FY 2020	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,472,000
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	174,100
	TPC	1,532,300	47,700	32,900	29,800	3,800	0	0	1,686,500[b]
FY 2021	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,886,000
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	174,000
	TPC	1,623,300	64,400	32,900	13,100	3,800	0	0	2,060,000[c]
FY 2022	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,886,000
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	174,000

[a] Per the Consolidated and Further Continuing Appropriations Act, 2015, the Spent Fuel Handling Recapitalization Project Major Construction Project funding includes both Total Estimated Cost and Other Project Cost. Therefore, the FY 2019 CPDS was updated to reflect appropriations only at the Total Project Cost level.

[b] The total amount of the entries is $1,646,500, but the total is stated as $1,686,500 to reflect the TPC that was established with the CD 2/3 Performance Baseline. The additional $40 million was first reflected in the FY 2021 CPDS.

[c] The total amount of the entries is $1,737,500, but the total is stated as $2,060,000 to reflect the TPC that was established with the October 2019 Performance Baseline Revision. The FY 2021 appropriation request included requirement updates through FY 2021 only, including the $40 million funding requirement with an additional $51 million requirement to implement the Performance Baseline revision. The FY 2021 appropriation schedule also included a shift of $16.7 million from FY 2025 to FY 2023 from the initial Performance Baseline that was not reflected in the FY 2020 CPDS.

($K)

Request Year	Type	Prior Years	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	Total
	TPC	1,779,005	157,845	106,250	16,900	0	0	0	2,060,000
FY 2023[a]	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,159,000
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	174,000
	TPC	1,830,300	397,845	139,250	16,900	0	0	0	2,333,000
FY 2024[b]	TEC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2,823,627
	OPC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	176,373
	TPC	1,830,300	476,798	199,300	292,002	176,000	25,600	0	3,000,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation of Beneficial Occupancy	3Q FY 2027
Expected Useful Life	40 years
Expected Future Start of D&D	3Q FY 2067

Related Funding Requirements
(Budget Authority in Thousands of Dollars)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	166.4	166.4	6,656	6,656

7. D&D Information

The new area being constructed in this project is replacing existing facilities. However, spent fuel handling operations in the existing Expended Core Facility will overlap with operations in the new Naval Spent Fuel Handling Facility for a period of 5 to 12 years, and examination operations in the existing Expended Core Facility will continue for the foreseeable future; therefore, the costs associated with D&D of the Expended Core Facility are not included in the costs cited for the Spent Fuel Handling Recapitalization Project.

	Square Feet
New area being constructed by this Project at the Naval Reactors Facility	213,000
Area of D&D in this Project at the Naval Reactors Facility	0
Area at the Naval Reactors Facility to be transferred, sold, and/or D&D outside the project including area previously “banked”	0

[a] The required funding profile through Project Closeout (FY 2027) was updated consistent with the July 2021 Performance Baseline Revision. The total amount of the SFHP Project entries is $2,384,295, but the total is stated as $2,333,000, consistent with the July 2021 Performance Baseline Revision. This difference is reflective of the FY 2022 Enacted amount of $400,000 compared to the request of $348,705.

[b] The FY 2024 CPDS revised the TEC, OPC, and TPC to reflect the October 2022 Performance Baseline Revision.

	Square Feet
Area of D&D in this Project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the Project including area previously "banked"	0
Total area eliminated	0

8. Acquisition Approach

The integrated Management & Operating (M&O) prime partners will plan and execute the Spent Fuel Handling Recapitalization Project in accordance with requirements. Naval spent nuclear fuel handling equipment will be procured through the procurement M&O partners. An Engineering, Procurement, and Construction Management (EPCM) firm was selected as the subcontracting strategy for design and construction management of the facility and facility systems. A 2019 amendment to the EPCM's contract changed the contract type from cost plus fixed fee to cost plus fixed fee—completion, reflecting the maturing design and the improved certainty in Project costs and schedules. Long-lead materials were purchased and site preparation work was performed ahead of CD-2/3.

GENERAL PROVISIONS—DEPARTMENT OF ENERGY

SEC. 301.

(a) No appropriation, funds, or authority made available by this title for the Department of Energy shall be used to initiate or resume any program, project, or activity or to prepare or initiate Requests For Proposals or similar arrangements (including Requests for Quotations, Requests for Information, and Funding Opportunity Announcements) for a program, project, or activity if the program, project, or activity has not been funded by Congress.

(b)

(1) Unless the Secretary of Energy notifies the Committees on Appropriations of both Houses of Congress at least 3 full business days in advance, none of the funds made available in this title may be used to—

(A) make a grant allocation or discretionary grant award totaling $1,000,000 or more;

(B) make a discretionary contract award or Other Transaction Agreement totaling $1,000,000 or more, including a contract covered by the Federal Acquisition Regulation;

(C) issue a letter of intent to make an allocation, award, or Agreement in excess of the limits in subparagraph (A) or (B); or

(D) announce publicly the intention to make an allocation, award, or Agreement in excess of the limits in subparagraph (A) or (B).

(2) The Secretary of Energy shall submit to the Committees on Appropriations of both Houses of Congress within 15 days of the conclusion of each quarter a report detailing each grant allocation or discretionary grant award totaling less than $1,000,000 provided during the previous quarter.

(3) The notification required by paragraph (1) and the report required by paragraph (2) shall include the recipient of the award, the amount of the award, the fiscal year for which the funds for the award were appropriated, the account and program, project, or activity from which the funds are being drawn, the title of the award, and a brief description of the activity for which the award is made.

(c) The Department of Energy may not, with respect to any program, project, or activity that uses budget authority made available in this title under the heading "Department of Energy—Energy Programs", enter into a multiyear contract, award a multiyear grant, or enter into a multiyear cooperative agreement unless—

(1) the contract, grant, or cooperative agreement is funded for the full period of performance as anticipated at the time of award; or

(2) the contract, grant, or cooperative agreement includes a clause conditioning the Federal Government's obligation on the availability of future year budget authority and the Secretary notifies the Committees on Appropriations of both Houses of Congress at least 3 days in advance.

(d) Except as provided in subsections (e), (f), and (g), the amounts made available by this title shall be expended as authorized by law for the programs, projects, and activities specified in the "Final Bill" column in the "Department of Energy" table included under the heading "Title III—Department of Energy" in the explanatory statement described in section 4 (in the matter preceding division A of this consolidated Act).

(e) The amounts made available by this title may be reprogrammed for any program, project, or activity, and the Department shall notify the Committees on Appropriations of both Houses of Congress at least 30 days prior to the use of any proposed reprogramming that would cause any program, project, or activity funding level to increase or decrease by more than $5,000,000 or 10 percent, whichever is less, during the time period covered by this Act.

(f) None of the funds provided in this title shall be available for obligation or expenditure through a reprogramming of funds that—

(1) creates, initiates, or eliminates a program, project, or activity;

(2) increases funds or personnel for any program, project, or activity for which funds are denied or restricted by this Act; or

(3) reduces funds that are directed to be used for a specific program, project, or activity by this Act.

(g)

(1) The Secretary of Energy may waive any requirement or restriction in this section that applies to the use of funds made available for the Department of Energy if compliance with such requirement or restriction would pose a substantial

risk to human health, the environment, welfare, or national security.

(2) The Secretary of Energy shall notify the Committees on Appropriations of both Houses of Congress of any waiver under paragraph (1) as soon as practicable, but not later than 3 days after the date of the activity to which a requirement or restriction would otherwise have applied. Such notice shall include an explanation of the substantial risk under paragraph (1) that permitted such waiver.

(h) The unexpended balances of prior appropriations provided for activities in this Act may be available to the same appropriation accounts for such activities established pursuant to this title. Available balances may be merged with funds in the applicable established accounts and thereafter may be accounted for as one fund for the same time period as originally enacted.

SEC. 302. Funds appropriated by this or any other Act, or made available by the transfer of funds in this Act, for intelligence activities are deemed to be specifically authorized by the Congress for purposes of section 504 of the National Security Act of 1947 (50 U.S.C. 3094) during fiscal year *2024* until the enactment of the Intelligence Authorization Act for fiscal year 2023.

SEC. 303. None of the funds made available in this title shall be used for the construction of facilities classified as high-hazard nuclear facilities under 10 CFR Part 830 unless independent oversight is conducted by the Office of Enterprise Assessments to ensure the project is in compliance with nuclear safety requirements.

SEC. 304. None of the funds made available in this title may be used to approve critical decision–2 or critical decision–3 under Department of Energy Order 413.3B, or any successive departmental guidance, for construction projects where the total project cost exceeds $100,000,000, until a separate independent cost estimate has been developed for the project for that critical decision.

SEC. 305. Notwithstanding section 161 of the Energy Policy and Conservation Act (42 U.S.C. 6241), upon a determination by the President in this fiscal year that a regional supply shortage of refined petroleum product of significant scope and duration exists, that a severe increase in the price of refined petroleum product will likely result from such shortage, and that a draw down and sale of refined petroleum product would assist directly and significantly in reducing the adverse impact of such shortage, the Secretary of Energy may draw down and sell refined petroleum product from the Strategic Petroleum Reserve. Proceeds from a sale under this section shall be deposited into the SPR Petroleum Account established in section 167 of the Energy Policy and Conservation Act (42 U.S.C. 6247), and such amounts shall be available for obligation, without fiscal year limitation, consistent with that section.

SEC. 306. No funds shall be transferred directly from "Department of Energy—Power Marketing Administration—Colorado River Basins Power Marketing Fund, Western Area Power Administration" to the general fund of the Treasury in the current fiscal year.

SEC. 307. None of the funds made available in this title may be used to support a grant allocation award, discretionary grant award, or cooperative agreement that exceeds $100,000,000 in Federal funding unless the project is carried out through internal independent project management procedures.

TITLE V—GENERAL PROVISIONS

SEC. 501. None of the funds appropriated by this Act may be used in any way, directly or indirectly, to influence congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. 1913.

SEC. 502. None of the funds made available by this Act may be used in contravention of Executive Order No. 12898 of February 11, 1994 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations).

SEC. 503. (a) None of the funds made available in this Act may be used to maintain or establish a computer network unless such network blocks the viewing, downloading, and exchanging of pornography. (b) Nothing in subsection (a) shall limit the use of funds necessary for any Federal, State, Tribal, or local law enforcement agency or any other entity carrying out criminal investigations, prosecution, or adjudication activities.

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